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ABSTRACT

As part of an updated series of activity oriented educational materials dealing with aspects of the Guam environment, this publication focuses on the common plants and animals found in schoolyards on Guam. Like a field guide, this publication contains descriptions, ecological information, and some historical notes about the common trees, shrubs, herbs, lichens, vertebrates, and invertebrates of Guam. Although materials are designed for Guam, they can be adapted to other localities. This publication introduces students to the basic techniques for studying schoolyard flora and fauna and can be applied to backyards, parks or any other area. (MR)

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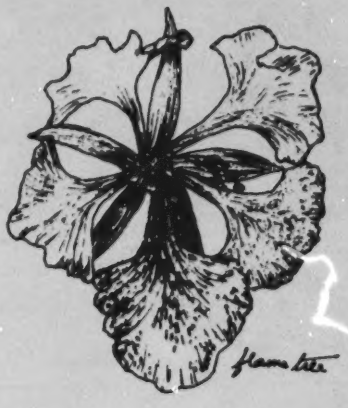
Life On Guam Schoolyard Surveys



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by Magdalena T. Flores

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SE 023 757

Life On Guam

...a project to produce relevant class, lab, and field materials in ecology and social studies for Guam junior and senior high schools. Funding is through a grant under ESEA Titles III and IV, U.S. Office of Education—~~HEW~~—whose policy, position, or endorsement is not necessarily reflected by the content herein.

"...to ultimately graduate citizens who are knowledgeable and conscientious about environmental concerns of Guam and the rest of the World."

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I - Introduction

When we make schoolyards and buildings, we change the land's form and its soil condition. We take away hills and build up the low places, filling in with crushed coral. We add dirt taken from other places in the Island. Then we put up the buildings and spread asphalt for the parking lot, and plant grass and ornamental plants for decoration.

To live in a schoolyard, ornamentals need constant watering and fertilizing. Other plants and animals living with them have to be able to take the heat reflected from the school walls and asphalt. They have to get along with limited space and lack of moisture. In spite of the changed environment that schoolyards offer, plants and animals do live there, for they adapt to disturbed land conditions.

This book shows what is what in the yards of Guam's junior and senior high schools. It is a guide. It features the most common plants and animals. First, you'll find trees, shrubs, herbs and lichens. Next come schoolyard animals.

Here's the general format:

Common names — Family name

Scientific name (genus and species) used by scientists over all the World

Schoolyard homes — Description and picture

On the next 2 pages, you'll meet some general plant parts, shapes and arrangements. From time to time you'll come across them in the plant section of the book (and in schoolyards, too).

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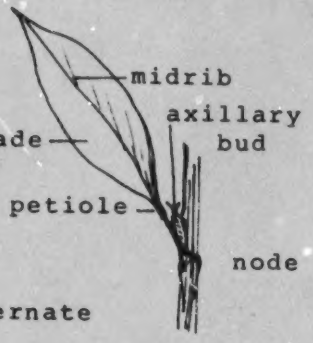
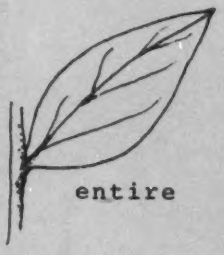
leaves grow at nodes along the stem.





MARGINS

SHAPES

ARRANGEMENTS

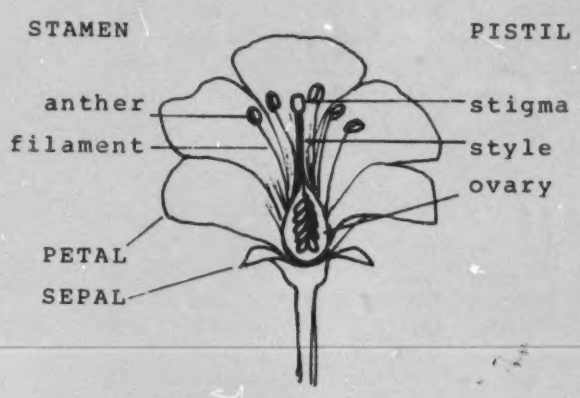
TYPES

SIMPLE

COMPOUND

flowers

are leaves specialized for reproducing.



flowers

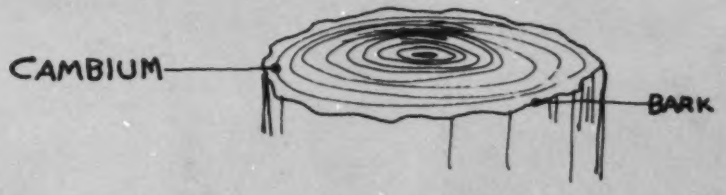
seeds

II - Plants

Most trees and shrubs on school campuses were brought to Guam from other places. Tropical America and the Philippines have supplied the most, and we also have some from Africa, Malagasy, other Pacific islands, Asia, and Australia.

Trees

A tree has one erect woody stem and grows to 5 m or more. Its 3 general parts are roots, trunk, and crown. The crown is all the branches and leaves. A tree grows higher and wider by adding new cells at the tips of branches and roots. It grows big and fat at the trunk by making new cells in the cambium layer.



(ALL THE REST IS WOOD.)

Plant a tree and grow a friend. In flower and out, a tree makes your surroundings more beautiful.

During lunch period and breaks, where do most of your friends gather for a brief relaxation? You are right! Under a tree—— because a tree provides shade. The tree keeps the schoolyard cooler. It's a windbreak, it screens out noises, and it feeds and protects animals that live at or visit the campus.

What other good things do trees offer?

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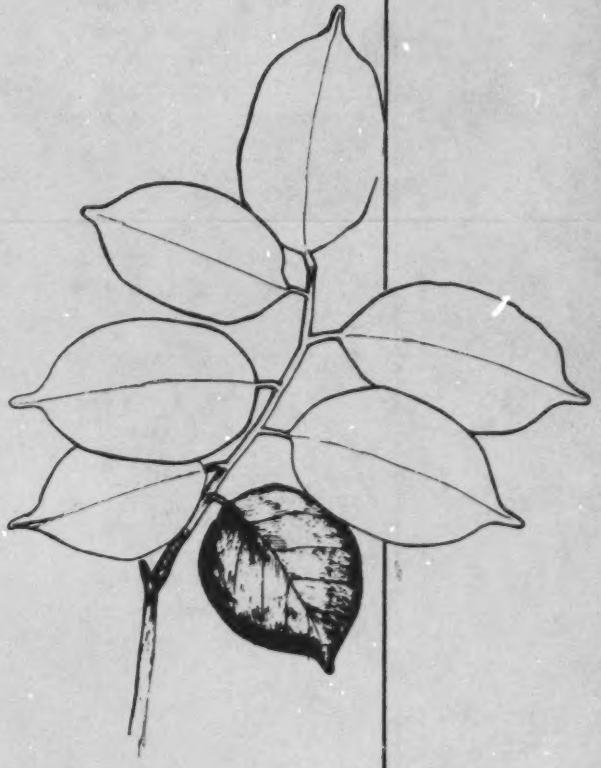
African tulip tree — Family Bignoniaceae
me'me' biha — Bignonias
Spathodea campanulata
AJJH, GW, JFK

This native of Africa has large, bright red-orange flowers in tapering clusters (racemes) at the tips of leafy branches. Blossom time is April-May. The flower bud holds water, and when you press it, it lets go. This gives the idea of urinating, and so we have the Chamorro name, me'me' biha.

You can grow it from seed or from root or stem cuttings. The ripe fruit is brown, 12 to 33 cm long. When it splits lengthwise, it sends out many flat seeds, each with a silken parachute that can sail away on a passing air current.

Leaflets of the compound leaf come in 3 to 9 pairs with an extra one at the tip. You can see one of our many introduced tulip trees inside the fence near the JFK student parking lot. It makes a nice resting place for tree sparrows and ratsnakes.

Angsana (Malaysia) — Family Leguminosae
narra (Philippines) — Beans
Pterocarpus indicus
JFK



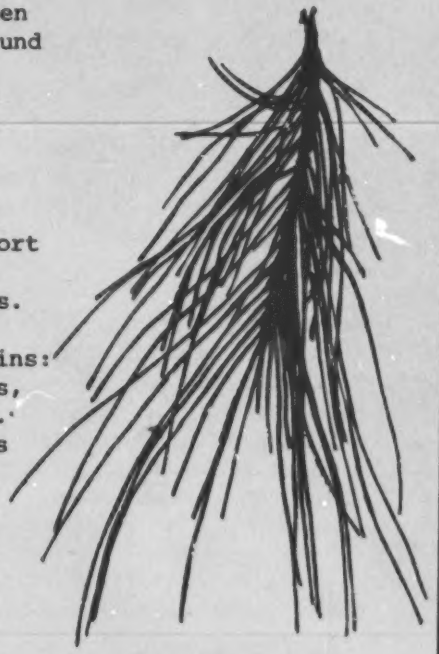
Narra is the official tree of the Philippines and was recently introduced to Guam. Before Typhoon Pamela, 4 of these dome-shaped, bushy trees were cultivated at JFK schoolyard. There's another at Pacific Terrace. How many more can you find?

The compound leaf has 5 to 11 alternate leaflets with a single one at the tip. Small yellow flowers, in panicles, are sweetly scented. In full bloom, March to April, the whole tree looks golden-yellow from a distance. Narra fruit, a pod, is round and flat, bulging

at the center where the seed develops. Around the seed is a thin 'wing' which carries it in the wind. The tree grows fast. The timber is excellent and isn't bothered by diseases and insect pests. It might be good to use for Guam reforestation.

Australian pine — Family Casuarinaceae
ironwood, gagu — Casuarinas
Native
Casuarina equisetifolia
AJH, BJH, DJH, IJH, JFK, GW

Gagu is often planted around homes as a hedge. For this, it has to be trimmed severely. If let alone, it grows into a tall cone-shaped tree.



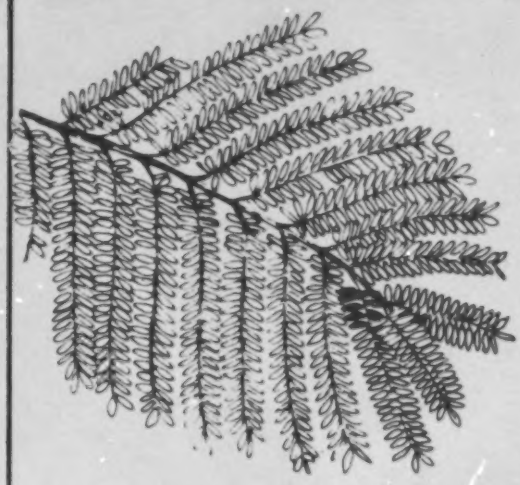
The green twigs are often mistaken for 'needles'. Each twig is many small short pieces joined together. Around each joint are several small scaly triangles. These are the leaves. The male and female flowers develop 2 types of catkins: Seeds are carried in the female catkins, rounder and thicker than the male ones. Catkins look like 'cones' and the twigs look like 'needles', so we miscall it a 'pine'. This tree is a flowering plant, not related to pines.

When the twig turns yellowish, look for tiny moth caterpillars.

The trees can take saltspray, typhoons and poor soil. A row of them makes a good windbreak.

Flame tree, royal poinciana — Family Leguminosae
atbot det fuegu — Beans
Delonix regia
AJH, AJJH, BJH, DJH, JFK, GW

The flame tree, from Malagasy, is planted many places around Guam. It grows very fast here. Since 1971 many have been afflicted by the poinciana looper which eats up the leaflets. The looper is the larval stage of the moth. The moth lays eggs on the underside of leaflets. (See poinciana looper, p 48.)



Flame tree leaves are pinnately compound (like feathers). Flowers are in clusters (racemes) near the branch tips. Each floret has 5 broad bright red petals. One petal is usually streaked with yellow or white. Flame trees bloom from April through July and enhance the beauty of home and schoolyard. The fruit pod is flat and woody; it starts out green and turns dark brown as it ripens. It may grow from 30 to 45 cm long. The tree reproduces by seed but can also be grown from root cuttings.

Golden shower — Family Leguminosae
kana' fistula — Beans
Cassia fistula
DJH, IJH, JFK

Rows of kana' fistula are planted at Skinner Plaza. One is by the main entrance to the Legislature Building. A few are planted in schoolyards. The tree at JFK is sickly-looking from insect infestation. The leaves often show they have been chewed. (It would be interesting to find out what does it. Try it!)

Large clusters of bright yellow flowers hanging down make this a favorite landscaping tree. It blooms from March to July, when the tree is bright yellow all around.

Kana' fistula's large compound-pinnate leaves have leaflets in 4-8 pairs. These are elliptical and 5-15 cm long. At the trunk the bark is whitish-gray.

Indian almond — Family Combretaceae - Terminalias
talisai
Terminalia catappa
GW

This tropical almond is a Guam native. The sets of branches from the main trunk have branchlets spreading out flat. This shapes it like a tiered cake or a pagoda. Its simple, large leaves turn reddish or brown, and fall once a year. At this stage they're collected by suruhanas and suruhanos to use in medicine. The tree is susceptible to insects. You can often see 10-cm green caterpillars crawling among the leaves.

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Talisai is also native to India. In that country unripe fruits are harvested to make tannin for tanning calf-, goat- and sheepskins.

In Guam kids often collect the half-ripe fruits. They chew the outer part for the sweet flavor. Ripe fruits are cut open with a machete to get out the edible seeds. People say these taste like hazelnuts. The ripe fruit has a dry husk-like wall and floats on water. In pre-war days children in southern Guam collected these water-spread nuts from river banks.

Today talisai are planted as ornamentals in schoolyards and parks and around homes.

Monkeypod, rain tree — Family Leguminosae - Beans
Subfamily Mimosoideae
Mimosas
Samanea saman
AJJH, DJH, JFK, GW

Naval Lt. William Safford, naturalist and aide to the Governor at the turn of the century, introduced this tree in the early 1900's. Its first home was tropical America but Safford brought it from Hawaii. Monkeypod grows into a very large umbrella shape. It is most useful in parks. There are several in Agana. Two large ones are at the south end of the Plaza de Espana, one mixing with a huge fallen elephant ear tree, Enterolobium cyclocarpum. 'Rain tree' gets its name from folding its leaflets as if to sleep before a rainstorm.

The flower is a pinkish powderpuff; the pistil becomes a fleshy dark brown fruit to 24 cm long. Ripe fruits are indehiscent (do not open by themselves). Their sweet pulp attracts animals which eat it and scatter the seeds.

The leaf is bipinnately compound with 2-8 primary leaflets. Each of these is again compounded into 2-7 pairs of ovate leaflets.

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Norfolk Island pine
Araucaria excelsa
AJH, AJJH, IJH,
JFK, GW

Araucariaceae
Araucarias
(from the name of a
Chilean Indian tribe)

Araucaria excelsa isn't a pine, but looks like one. When it matures it is cone-shaped. A native of Norfolk Island, north of New Zealand, it has been introduced and cultivated in many parks, homes and gardens in the tropics and subtropics.

The whorled branches and overlapping evergreen leaves make it very attractive. Many people like to plant it in pots.

In our environment it doesn't produce flowers, possibly because it comes from a subtropical, not a tropical climate. New plants can be grown from shoots growing out of the trunk and branches. Norfolk pines are in the courtyard at JFK, at the Cathedral, at Paseo de Susana, and on San Ramon Hill.

Orchid tree, bauhinia,
mariposa, St. Thomas tree
Bauhinia monandra
AJH, SSJH, JFK

Leguminosae
Beans

The late Antonio R. Cruz, a Chamorro naturalist, introduced one species of mariposa to Guam. This is the St. Thomas tree. It comes from tropical America. Mr. Cruz set up a mariposa nursery at Adelup where Guam Recreation Center now stands. His project led to the wide cultivation of mariposa around the Island.

The flowers look somewhat like orchids. Now several species of Bauhinia are common here, with red, white, or lavender flowers.

You could say that the paired leaves look like kidneys, or that they're like butterfly wings.

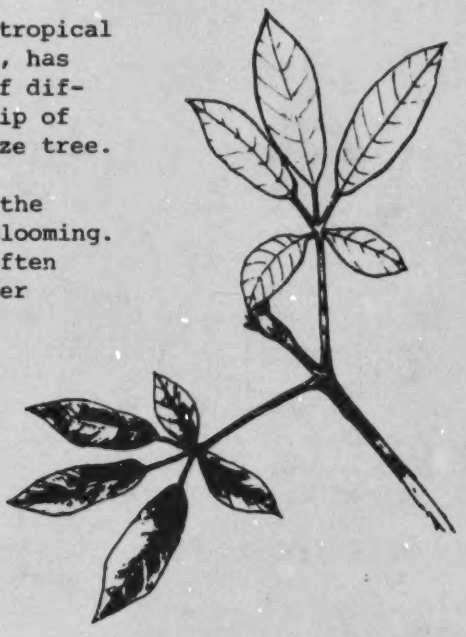
You can often see ratsnakes and anole, the green lizard, resting on the branches.

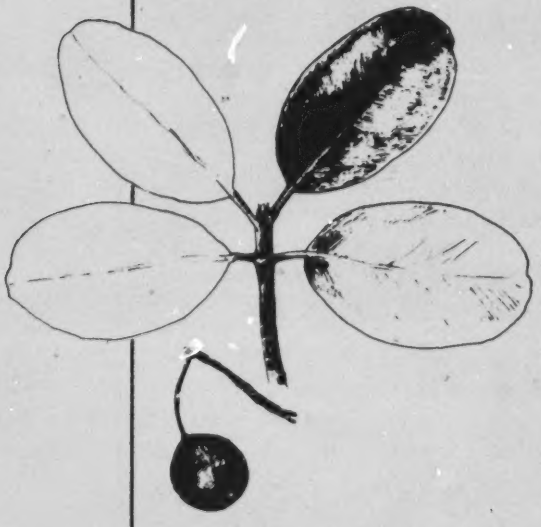
10

Pink tecoma — Family Bignoniaceae
Tabebuia pentaphylla — Bignonias
AJH, BJH, DJH, IJH,
SSJH, JFK, GW

Pink tecoma, a tropical American native, has compound leaves with 5 leaflets of different sizes radiating from the tip of the leafstalk. It is a medium-size tree.

The tubular flowers are pink and the whole tree is pinkish when it's blooming. The flowers are short-lived and often cover the ground under a tree after they fall.





Palu Maria, da'ok — Family Guttiferae
Calophyllum inophyllum — Mangosteens
AJH, DJH, IJH,
SSJH, JFK, GW

Da'ok is good for parks and schoolyards because it produces a lot of branches making excellent shade.

Many da'ok are planted along Marine Drive in downtown Agana.

The flowers are small, white and in clusters. Fruits are smooth and rounded. They float, and can be spread by water. They are also poisonous——don't eat them.

The simple leaves are opposite each other on the stem.

Palm trees Family Palmae

Coconut, niyok
Cocos nucifera
AJH, AJJH, BJH, DJH, IJH, SSJH, JFK, GW

Tronkon niyok has a rough, tough, fibrous, and often curved trunk. The base is often swollen. The one main trunk has a crown from which pinnate leaves, flowers and fruits develop.

We use every part of this tree. (See Beach Strand, p 29.) It provides food, oil, vinegar, yeast, and drinks, both fermented and non-fermented. It also gives us thatch weaving materials, wood, and medicine from roots and bark.

The very common variety produces seeds in 7-10 years. The dwarf palm, smaller and introduced, produces within 3 years. Many are planted at homes and schoolyards as ornamentals and for coconuts.

Flowers are formed within a club-like spathe. As the spathe opens, male flowers develop at the end. Female flowers are scattered at the base of the spathe.

The fruit is one-seeded, surrounded by a fibrous wall and hard shell with 3 'eyes' at the top (as it grows on the parent). The outer husk of the fruit provides a harsh fiber sometimes used for upholstery and other stuffing. This is coir, which we still use to make doormats and sennit for ropes and lashings. To process the husk fiber, nuts are retted (soaked) in salt water for some weeks. Then they are hackled (beaten) to separate the fiber, and washed and beaten again for further separation, and dried.

In Guam the husk is used for potting aerial plants like orchids and ferns. It's also used as fuel.

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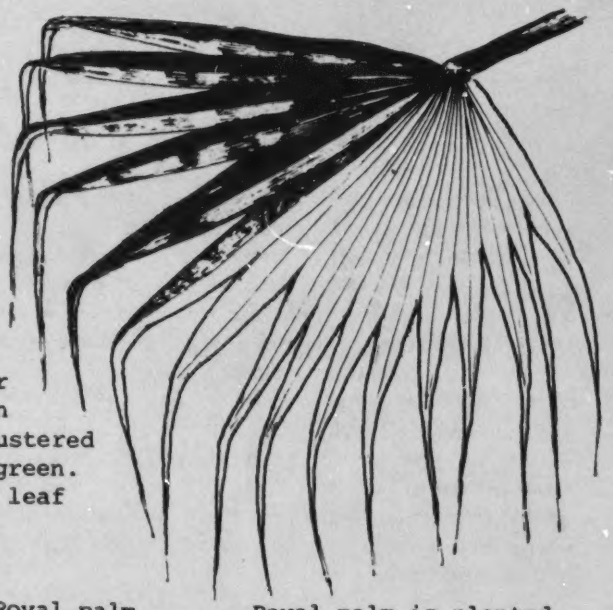
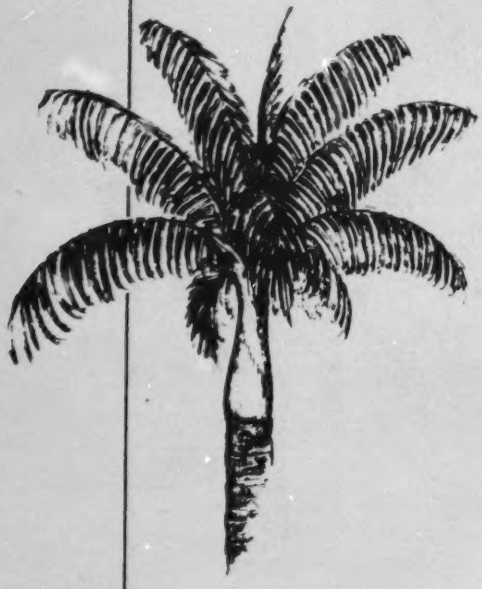


Chinese fan palm
Livistona chinensis
JFK, GW

This palm bears bright green, strongly arched leaves. Including its stem, the leaf extends, like a palm and many fingers, 1.2 to 1.5 m, with slender, abruptly drooping tips. Look for the spiny leaf margin in younger leaves. The clustered fruits are dull bluish-green. Wasps often nest on the leaf undersurface.



Royal palm
Roystonea elata
JFK, GW

Royal palm is planted more often along roadsides than at homes, because it can grow to 30 m tall. Rows of them are near the sidewalks of JFK and at Plaza de Espana.

The smooth, erect trunk produces long green leaf sheaths and is topped by a remarkable crown of feathery leaves. Look for lichens on the bark. You may also find ants and lizard eggs in the cracks and at the base of the tree.

Merrill's palm
Christmas palm
pugua' China
Veitchia merrillii
AJH, DJH, IJH,
JFK,

Pugua' China is much planted around homes and schoolyards. It grows to about 6 m tall. The name 'Christmas palm' is given for the great clusters of bright red 2.5 cm fruits which hang from the trunk below the leaves at Christmas time.

Rubber tree
Ficus elastica
AJJH, BJH, SSJH, GW

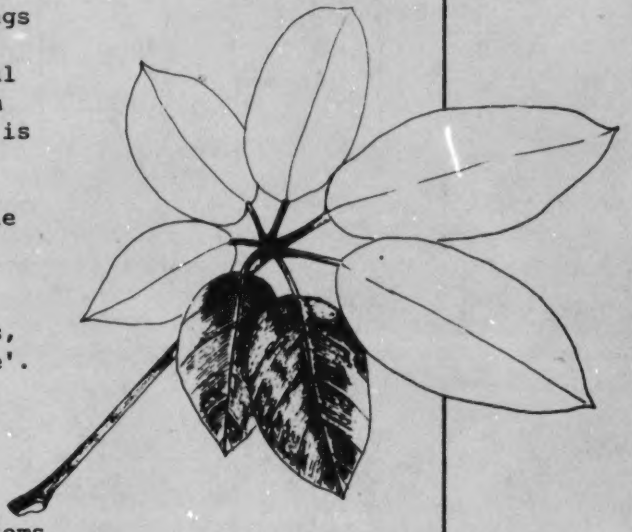
Family Moraceae
Figs

This fig tree from India is everywhere used as a house plant. In Guam we also plant it in schoolyards. In the open it develops many proproots. Some Chamorros say the tree makes a nice home for taotaomonas, and for that reason, it is often cut down.

The leaves are simple and pinnately veined. Their upper surface is dark shiny green; the under side is lighter. The stipules are long and red. When cut, the stem oozes a white, sticky, rubbery sap.

Umbrella tree
ivy palm
Brassaia actinophylla
SSJH, GW

Family Araliaceae
Ginsengs



This symmetrical tree comes from northern Australian rain forests. It is cultivated around the World for house and street decoration. The 7-9 large, glossy leaflets whorl out like a little umbrella from the branch tips.

In flowering, several tails with red florets spread out from a central axis, so Hawaiians call it the 'octopus tree'.

Plants are cultivated here in schoolyards, homes, and in front of Nieves Flores Library. People here like to plant them in pots. New ones can develop from shoots taken along the stems.

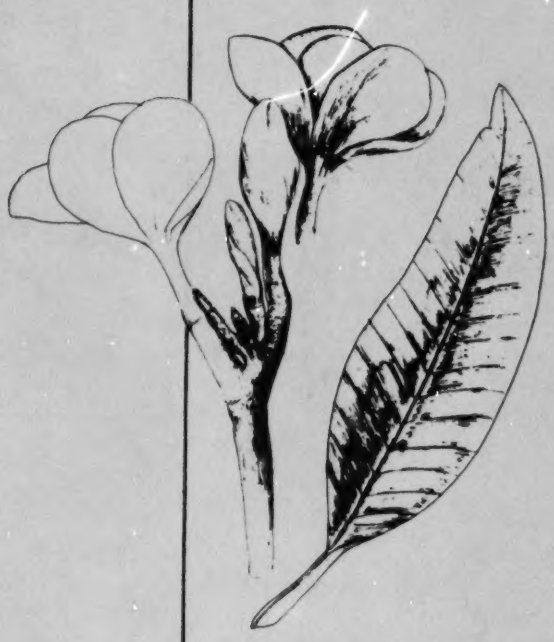
Plumeria, kalachuchan a'paka (white), kalachuchan agaga' (red, pink, maroon), kalachuchan amariyu (yellow)
Plumeria rubra

plumerian Singapon (white)
P. obtusa
AJH, AJJH, BJH, DJH, JFK, GW

Family Apocynaceae
Periwinkles

In the plumerias are fragrance, beauty and poison. The most common plumeria in the schoolyard is plumerian Singapon, from Singapore. It's small and sturdy with a dense crown and large, shiny,

14



stiff leaves. The leaves of P. rubra are deciduous——they all fall off at the same time——here, during the dry season. This is nice because there are many flowers when the leaves are few.

Flowers of kalachuchan a'paka are much used for leis. Petals are waxy white with a tinge of yellow at the center.

Leaves are simple, branches are thick and swollen. The trunk is apt to be crooked. Look at it for plant galls, swellings from fungal or other parasitic infestation.

Kamachili — Leguminosae - Beans
Pithecellobium dulce — Subfamily Mimosoideae
DJH, IJH, JFK — Mimosas

This tree was introduced to Guam from Mexico via the Philippines. We like it for its edible fruit. Its bark can be used for tanning leather. Kamachili is common in and around villages. A few grow around schools. Students disperse the seeds by scattering them on the ground as they eat the fruit. The mature tree is loosely branched. If the growing tree is kept pruned to shrub size, it becomes a bushy ornamental for landscaping. This is done at Inarajan Jr. High School.

Kamachili has paired bipinnate compound leaves. Leaflets look like butterfly wings. Examine the leaflets for yellow butterfly eggs and caterpillars. This tree grows a lot in southern Guam, and the yellow butterfly species is also common there. It would be interesting to study the relationship further.

The flowers are greenish-white in dense heads. They eventually develop into twisted swollen pods.

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Ibba', Tahitian gooseberry
Phyllanthus acidus
AJH, AJJH, DJH

Family Euphorbiaceae
Spurges

This small tree grows to 9 m tall, producing fruits with a pleasantly sour taste. They are often eaten with salt and pepper. They're drupes——inside the flesh is a hard-walled shell containing the seed.

Seed dispersal is done by people eating the fruit and throwing away the seed.

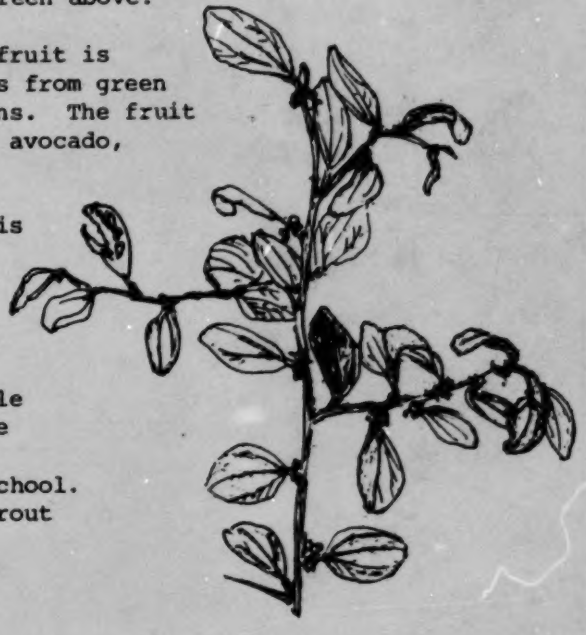
The compound leaves are pinkish and drooping when young.

Manzanan dikike'
manzanan paotake'
apple
Zizyphus mauritiana
None noted at schools

Family Rhamnaceae
Buckthorns

There are prickly thorns along the stem of this small tree. The simple leaves, also small, are white underneath and dark green above.

The edible, oval, 2-seeded fruit is about 2.5 cm long. It turns from green to yellow-orange as it ripens. The fruit is a drupe, like the olive, avocado, and ibba'.



The branch with the leaves is used for medicine. When brewed, the liquid is used as cleansing fluid for personal parts.

Seeds are dispersed by people and animals. We include the tree here because students often bring the fruits to school. Eventually the seeds may sprout in schoolyards.

16

Mangga, mango — Family Anacardiaceae
Mangifera indica — Mangoes
M. odorata
AJH, IJH, JFK

Our varieties of mangoes are manggan Saipan, manggan karabao, and manggan pikose. All are from tropical Asia. Those sold in supermarkets are haden mango. Few of this kind are being grown here.

Manggan Saipan is the variety that children often eat with salt and pepper. When freshly picked, the fruit stem oozes a milky sap that needs to be washed off thoroughly before eating. Then you won't get an allergic rash reaction around your mouth.

The leaves are simple and in whorls. Young leaves are purplish. They can be collected and pickled in fina'denne'. The seed within a stony ovary wall is a drupe.

Sea grape — Family Polygonaceae
Coccoloba uvifera — Polygalas
JFK

If this plant is away from the beach, it grows 6 m tall. At the beach it grows only to shrub size. The tree can withstand saltspray and can tolerate our sandy and limestone soils.

The leaf is round and stiff. It is firm enough for you to write on. Notice the red midrib of the leaf. The margin is smooth, and there's a small but definite axillary bud.

Fruits come in greenish grape-like bunches.

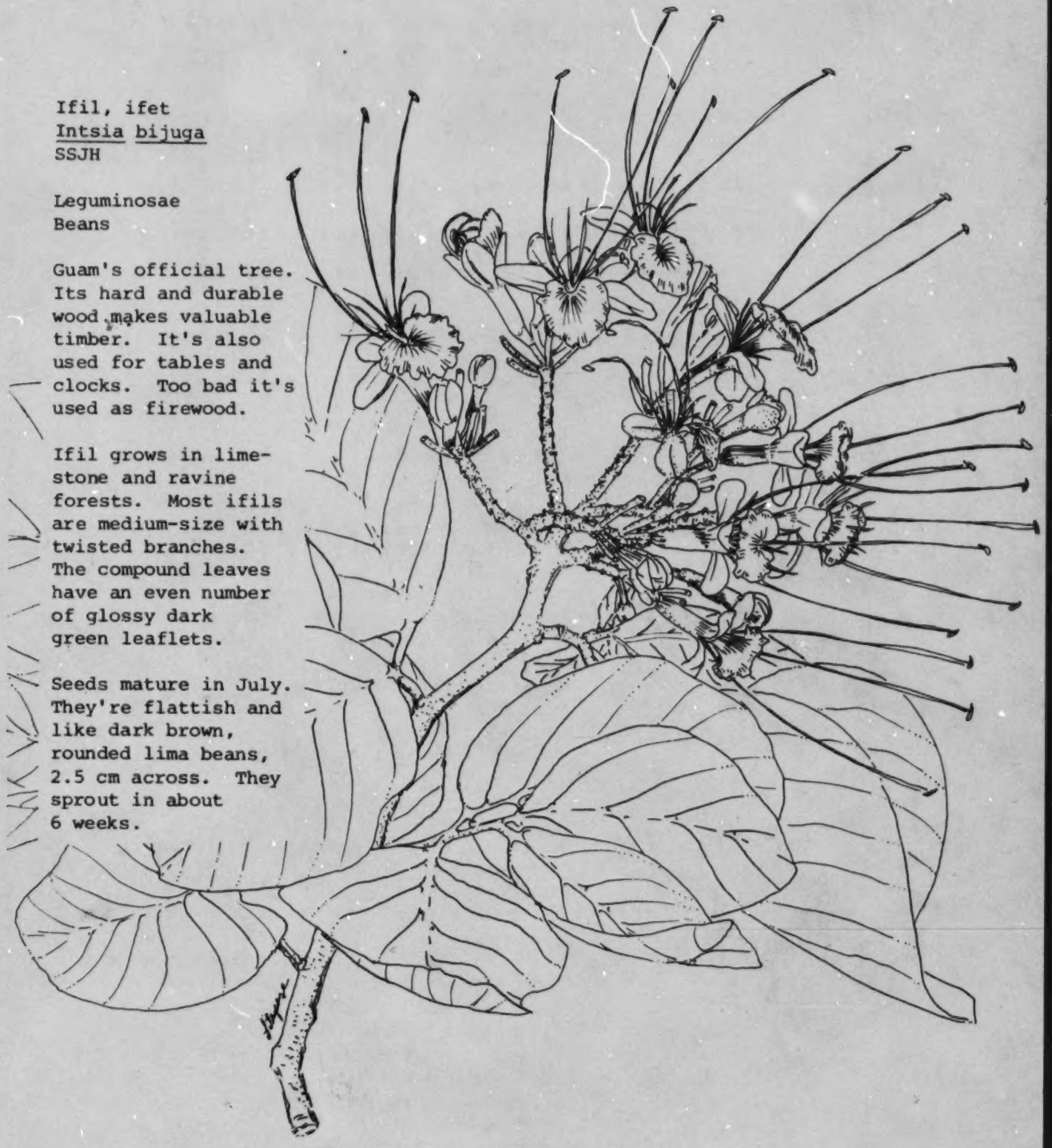
Ifil, ifet
Intsia bijuga
SSJH

Leguminosae
Beans

Guam's official tree. Its hard and durable wood makes valuable timber. It's also used for tables and clocks. Too bad it's used as firewood.

Ifil grows in limestone and ravine forests. Most ifils are medium-size with twisted branches. The compound leaves have an even number of glossy dark green leaflets.

Seeds mature in July. They're flattish and like dark brown, rounded lima beans, 2.5 cm across. They sprout in about 6 weeks.



18

Shrubs

People like to grow shrubs, probably because we're about the same size they are, and many of them have colorful flowers and leaf patterns. Which shrubs do you see as you walk to your next class? Can you tell a shrub from a tree? In checking, examine the amount of wood a shrub has. Compare its height to a tree's. Which group grows taller? Describe their shapes.

Several shrubs on Guam, including the first on our list, are poisonous. Don't taste any of them unless you're sure they're harmless.

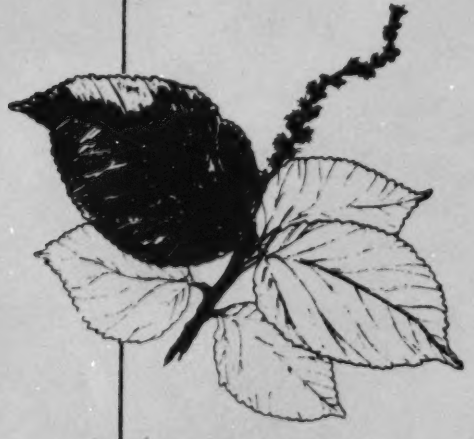
Allamanda — Family Apocynaceae
kupa de oru — Periwinkles
Allamanda cathartica
JFK

Beware! This shrub is poisonous. All its parts are deadly if taken internally.

We have 2 kinds of 'cup of gold'. One is a woody climber, the other is short and bushy. Both have bright golden flowers in clusters.

The simple glossy leaves are many and grow in whorls around the stem.

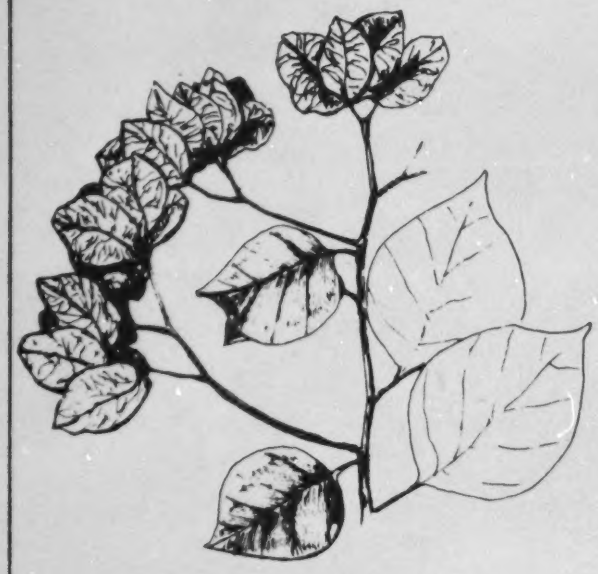
Related to this species is Allamanda violacea, a beautiful slender vine with glossy, narrow leaves. The clustered flowers are reddish purple and fade after blooming.



Beefsteak plant — Family Euphorbiaceae
copperleaf — Spurges
Joseph's coat
Acalypha wilkesiana
AJJH, DJH, GW

Beefsteak plant has bright red leaves with dark green spots. It makes an excellent hedge if it's not badly eaten by insects. The leaf is simple and slightly scalloped.

This shrub has 2 kinds of flowers. Male ones droop and look like a rat-tail. They produce the pollen. Female flowers grow on upright spikes with reddish tufts.



Bougainvillea, puti tai nobiu
Bougainvillea spectabilis
DJH

Nyctaginaceae, Four o'clocks

B. spectabilis is Guam's official flower. Like all bougainvilleas, its climbing woody stems are armed with spines.

Often the largish 3-part bracts are mistaken for the small true flower, which the bracts actually surround. The bracts come in red, orange, white or pink, and sometimes white and pink together.

Puti tai nobiu can be grown from stem cuttings. Most people here pot it; that way they can easily control the growth.

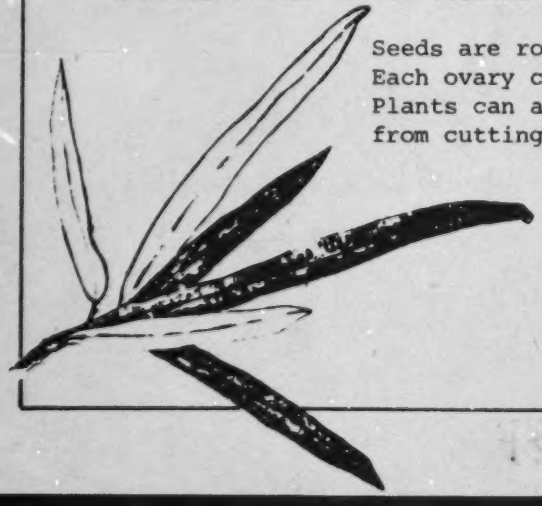
Croton, leston puyitos, buena vista, San Francisco
Codiaeum variegatum
AJH, AJJH, BJH, DJH, SSJH, JFK, GW

Family Euphorbiaceae
Spurges

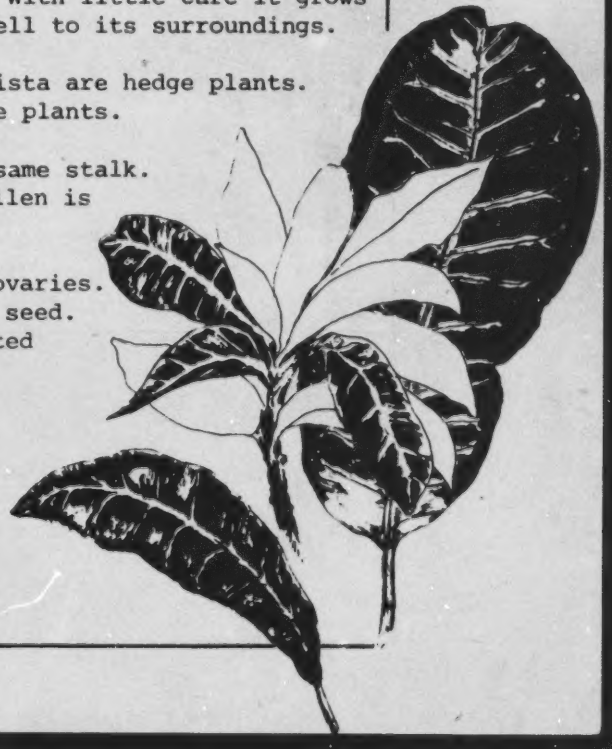
Croton is the commonest ornamental shrub in schoolyards. With little care it grows fast, adapting well to its surroundings.

Leston puyitos, San Francisco and buena vista are hedge plants. Other colorful crotons are potted as house plants.

Male and female flowers are borne on the same stalk. Male flowers open first, assuring that pollen is available when female flowers open.



Seeds are round with 4 ovaries. Each ovary contains one seed. Plants can also be started from cuttings.



20

Crape myrtle — Family Lythraceae
melindres — Loosestrifes
Lagerstroemia indica
JFK

Melindres produces showy flowers of either pink or white. Flowers cluster at the branch-tips. The petals are wrinkled.

The simple leaves are alternate, one leaf at each stem node. The shrub makes a fine garden setting, but around most homes is planted as a hedge.

Federiku palm — Cycadaceae - Cycads
Fadang, federiku
Cycas circinalis
GW (forest)

Fadang may look like a palm but it isn't even related. It's a gymnosperm, a non-flowering plant. It grows in the understory of the woods near the coast. (See Limestone Forest, p 14.)

The compound leaves are pinnate and grow in whorls around the top of the trunk. They are glossy and dark and can resist heat and saltspray.

For many years federiku were cut down and used for decoration, probably why we see so few now. (Thanks to the U. S. Air Force for fencing off their property, protecting fadang from extinction.) Guam law now prohibits cutting this tree or removing its leaves.

Seeds are smooth and round, green at first, turning purplish when ripe. In harvesting, the whole cluster of them is usually cut at once. Raw ones contain a poison that can be removed by soaking and several washings. The plant is suspect as a possible cause of lytigo, a paralyzing disease 10 times more common among Guamanians than other Americans. In 2-1/2 years of Japanese occupation during World War II, my family ate about 5 drumfuls of dried seed. None of us has lytigo (1977).

Water currents often carry the seeds to river banks and beaches. More plants can be produced by planting seeds. Today federiku is much used for landscaping around homes and schoolyards.

Ixora, santan — Family Rubiaceae
Ixora chinensis — Coffees
(horticultural forms)
AJH, GW

This popular ornamental shrub flowers throughout the year with little care. It is favored as a hedge because of its dense branching and growth of new plants from root shoots.

The flowers are yellow, red, pink, white or tangerine without fragrance. The red type is rather common. The many flowers are in terminal clusters. The petals are united in a slender tube about 2.5 cm long, split at the tip into 4 spreading lobes.

The short-stalked, simple leaf is narrower at the base than the tip. It's easiest to get new ixoras from the root shoots. They can also be propagated from stem cuttings.

Hibiscus, flores rosa — Family Malvaceae
Hibiscus rosa-sinensis — Mallows
AJH, AJJH, BJH, DJH, JFK, GW

Ornamental hibiscus comes in many varieties; some have a set of 5 opened petals, some have closed petals. Flowers are pink, red, yellow, bright orange, maroon, or white. Some are large with double petals and some are small and single-petaled.

The ones growing in schoolyards and at many homes include the common red, the coral, the pink, and a hybrid double pink. The hybrid closed-petal maroon hibiscus was once at Inarajan Junior High. Is it there now?

The common red hibiscus grows well with little care. The belllike flower has a long, hanging pistil. The pistil tube divides into 4 sticky stigmas at the tip. Alongside the tip of the pistil are the male stamens. The flower bud of this variety is used locally for treating boils. It draws the pus to the surface, eventually causing the boil to break open.

22

Jatropha — Family Euphorbiaceae
Santa Ana, — Spurges
Jatropha hastata
DJH, IJH, SSJH, GW

The slender stems of this shrub droop as they get heavy with flowers and leaves.

The flowers are in clusters at the tips of the stems. The floral buds and petals are bright red. They bloom all year. Pruning twice a year results in an abundance of showy flowers. Jatropha can be grown from seeds or cuttings. It prefers full sun.

Oleander — Family Apocynaceae
adetfa — Periwinkles
Nerium indicum
DJH, JFK

Oleander's milky sap is highly poisonous. Do not use oleander twigs for turning barbecue food--or as firewood, for the smoke from them is deadly, too.

The leaves are in whorls of 3 or 4, around erect, smooth stems. They are narrowly lance-shaped.

The single or double flowers are clustered at the stem-tips. They can be white, pink, red or salmon. Most common in our school-yards is the pink one.

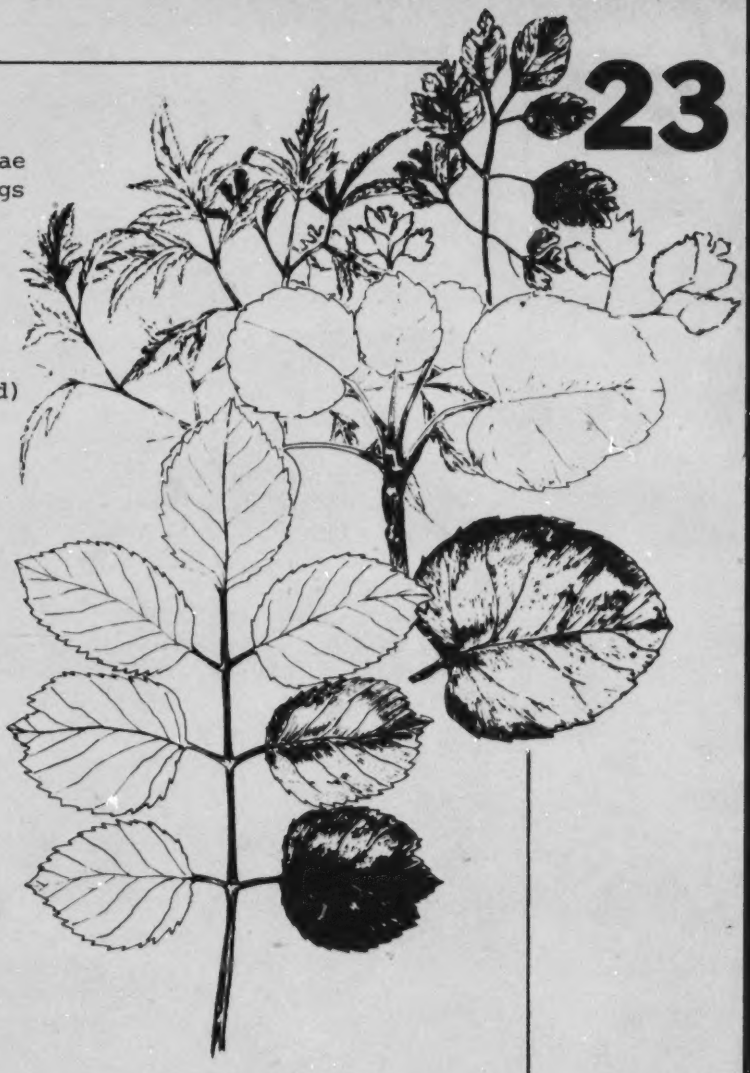
Fruits are in pairs, cylindrical and narrowed at both ends. Oleander is easily propagated by stem cuttings.

Panax
platitos (saucers)
Polyscias scutellaria

Araliaceae
Ginsengs

pepega (compound leaves)
P. guilfoylei

hedge panax, kapua
(bi- or tri-pinnately compound)
P. fruticosa
AJH, AJJH, JFK, GW



Several kinds of panax have been introduced here. The variations are in leaf form. One is often used for dishing out salad. The other simple-leaf type is round, too, but it's smaller and pale yellow.

Hedge panax, pepega, has a compound leaf. The other panaxes are used for potted plants and landscaping. Color variations include different shades of green to yellow or combinations of white and green.

Poinsettia, Christmas flower
ponsettas
Euphorbia pulcherrima
JFK

E. cyathophora (dwarf poinsettia)

Family Euphorbiaceae, Spurges

Red leaves near the flower cluster make poinsettias especially important around Christmas time. This plant secretes a poisonous white sap that can cause skin irritation, blindness——even death, if eaten in large quantity.

Propagation is usually by stem cutting, but the hybrid double poinsettias should be air-layered. (See the LOG unit Farm and Garden, pp 27-28.)

The herbaceous dwarf wild poinsettia grows on limestone roadsides and in old fields.

24

Tangantangan — Leguminosae - Beans
Leucaena — Subfamily Mimosoideae
leucocephala — Mimosas
AJH, AJJH, BJH, DJH,
SSJH, JFK, GW

A man cutting down tangantangan is often seen along the road. He's going to use the stems to make a bean trellis, or maybe for barbecue wood, and the branches for pig and goat feed, sometimes for cattle but not for horses. Mimosine, a chemical produced in the plant, would make their mane and tail hairs fall out. (See Savanna, Old Fields, Roadsides, p 36.)

Tangantangan seeds are often collected to make necklaces, bracelets, or earrings. The seeds are boiled before they're strung.

The compound leaf has 10-18 pairs of small leaflets along each leaf stem.

Tangantangan can withstand poor soil like that in disturbed areas and on limestone. It holds soil and prevents erosion. Since it's a bean, it should return nitrogen to the soil.

Tangantangan also resists diseases and insect pests. It's often visited by lizards, ratsnakes, spiders, many kinds of insects, and African snails.

Herbs

Herbs are plants with non-woody stems above ground. Most of them are small. Some herbs are 'weeds' but many are useful in medicine.

We have ornamental ones, too, planted for decoration.

The next pages describe some herbs you can see at schoolgrounds.

Ti plant
baston San Jose
Cordyline fruticosa

Liliaceae
Lilies

This herb grows one slender, erect stem (may be 3 m tall) with leaves and flowers at tips of branches. Leaves are lance-shaped with parallel veins, reaching a length of 60 cm. Leaves are in shades of red, pink, purple, green. The plant is easily grown from stem cuttings.

Baston San Jose is used in landscaping. The local name suggests that this is the plant St. Joseph used for a cane (baston). Leaves of a relative, the all green ti plant of Hawaii, are used for wrapping food and girls (hula skirts).

Elephant ear
korason di Santa Maria
Caladium bicolor

Araceae
Arums

Korason di Maria is a fancy-leaf caladium that grows from a tuber. Green on the leaves blends with various shades of pink, white, red and lavender. The 'elephant-ear' leaf dies down during winter.

Korason di Maria is related to the boonie elephant ear, giant taro, now often collected and cultivated as an ornamental plant.

26

Banana
tronkon chotda
Musa paradisiaca

Musaceae
Bananas

Because of its height the banana plant is often called a 'tree'. It's really a giant tropical herb. The leaf is simple and large. It develops from a non-woody underground stem. Although the plant has flowers, the flowers produce infertile seeds (they can't sprout). You can get new plants from buds growing on the parent stem.

Guam has several varieties of bananas. Aga' Manila and aga' Macao are the most common eating bananas. The common cooking banana is chotdan long. It's often fried or made into doughnuts. It's also good for landscaping, because it can grow better in poorer soils than other bananas can.

Spider lily
Tronkon lirio
Hymenocallis littoralis

Amaryllidaceae
Amaryllises

Seeds grow into bulbs. The underground bulbs produce sword-like leaves to 1.3 m long. Plants grow in clumps. The flower is white with 6 thin spidery petals and 6 long stamens. Plants grow wild on the beach strand and are now also cultivated.

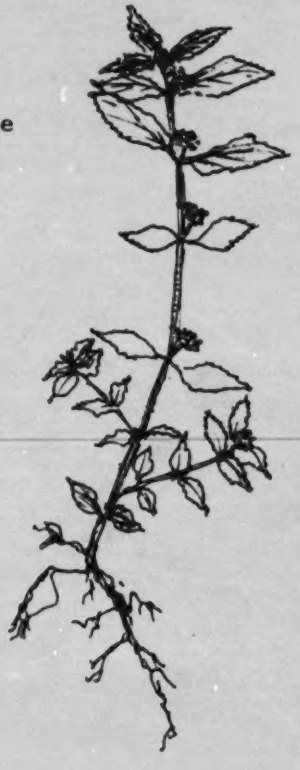
'Weeds'

Bitter melon, balsam apple — Cucurbitaceae
atmagoson halom tano' — Gourds
Momordica charantia

This slender climber has palmate, lobed leaves. The yellow flower develops into a rounded rough-skin fruit. In ripening, fruit turns from yellow to red-orange, about 8 cm long, enlarging at the middle. It contains several flattened seeds embedded in a bright red pulp. The plant is grown from seed. The seed can remain dormant in the ground for a long time. It will germinate once the area is cleared off.

Although wild, atmagoson halom tano' is collected for food and medicine. Chamorro mothers boil the leaves and have their newborn babies drink the liquid for its cleansing effect on internal organs. (Since there's no scientific background on this, I don't recommend that you try it out.) It's also said that the plant helps lower high blood pressure.

Garden spurge, golondrina — Euphorbiaceae
Euphorbia hirta — Spurges



This herb is an annual——it grows only one season——with an upright stem to 40 cm high. The stem is hairy and purplish. It produces simple, opposite leaves with a dark green to purplish top surface and whitish green beneath. The leaf is ovate and short-stemmed.

The small flower comes in shades of green or purple.

The plant is often collected and dried to use in medicine. Combined with other plants, it's used in many cures.

28

Maigo' lalo' — Euphorbiaceae
Phyllanthus amarus — Spurges

The medicinal properties of this weedy plant make it valuable. Chamorros use it in combination with other plants for curing many illnesses, including flu, Guam sores, nephritis, pisagon (painful urination), athlete's foot and for personal cleansing.

Maigo' lalo' is an annual. The stem is erect with all parts, including the flowers, green. One compound leaf grows at each node. At the base of each leaflet a tiny flower blooms. This flower develops into a small rounded capsule.

The plant has a taproot.

Passionflower, love-in-a-mist — Passifloraceae
mediu dia, flores a las tres — Passionflowers
Passiflora foetida

This is a smooth-stemmed vine that climbs over other plants in weedy areas around schools and roadsides. The name 'mediu dia' points up that the flower opens at mid-morning and stays open for only half the day. 'A las tres' indicates the flower's closing time, 3 o'clock in the afternoon.

The leaf is 3-4 cm long with 3 pointed lobes. Flowers are borne singly at nodes. Below the flower petals are 3 finely-divided fuzzy bracts that protect the flower bud. The berry-like fruit is yellow-orange or scarlet, rounded, with a tough rind in 3 or 4 sections. Inside the 2-cm diameter fruit are many flat seeds embedded in whitish pulp. The fruit is edible. Seeds are scattered by animals that eat the fruit.

Amaranthaceae - Amaranths

Spiny amaranth, kilites Kilites a'paka
Amaranthus spinosus Amaranthus viridis

The erect stem of A. spinosus is armed with sharp spines. It develops side branches that can produce greenish flower spikes. Seeds are very small and have long viability——they can wait a long time to sprout.

Leaves are alternate and to 8 cm long. The leaf is broadly lance-shaped, pointed at the tip and narrowed down where its base attaches to the petiole.

Kilites a'paka has an erect unarmed stem growing to 60 cm high. Its greenish flower spikes are much denser than the ones on kilites. The leaf can be 8 cm long and is ovate. Leaves are edible.

Sensitive plant, subetguensosa
Mimosa pudica Leguminosae - Beans

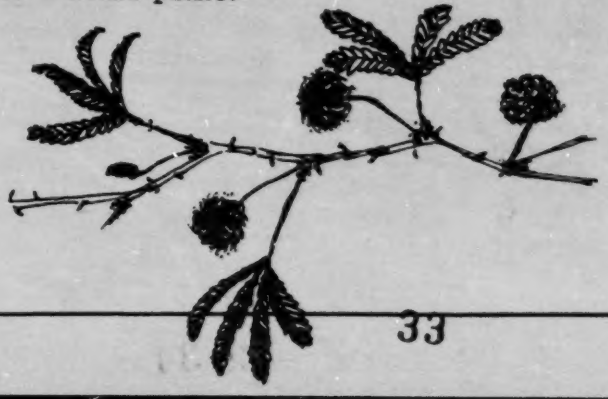
The local name for this prickly-stemmed herb indicates that it's 'haughty'——it's sensitive to the slightest touch and responds by folding its leaflets.

The 4 leaflets radiate from one point on the petiole.

Flowers arise from the same nodes as the leaves. The flower head is pinkish with many stamens. Seeds form in pods clustered at the top of the flower stalk. Each pod has spines which can cling to animals' fur and to clothing.

The plant reproduces by seeds or runners creeping along the ground. (Since they creep, why do we call them 'runners'?)

The roots are locally used as medicine. In other places Mimosa is grown as a house plant.



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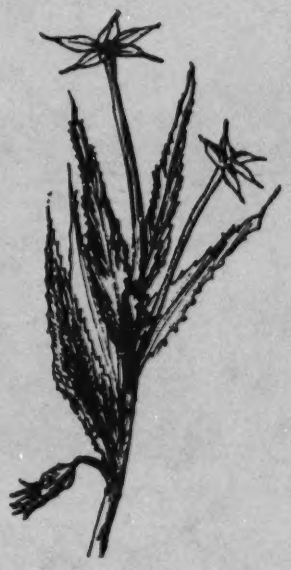


Star of Bethlehem — Lobeliaceae
Laurentia longiflora — Lobelias

The sap of this small perennial herb is very poisonous. The white tubular star-like flowers develop singly on the stem. The fruit is a nodding capsule. The leaf is narrow and sessile (without a leaf stalk). The leaf margin has many pointed teeth.

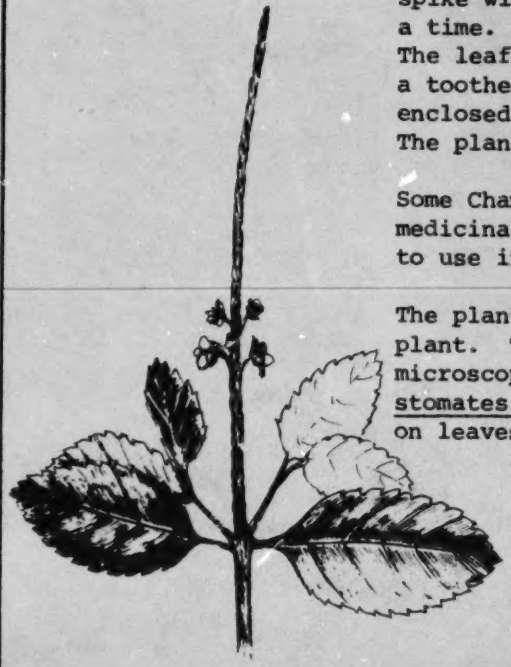
The plant is grown from seeds.

False verbena, vervain, laso' katu — Verbenaceae
Stachytarpheta indica — Verbenas

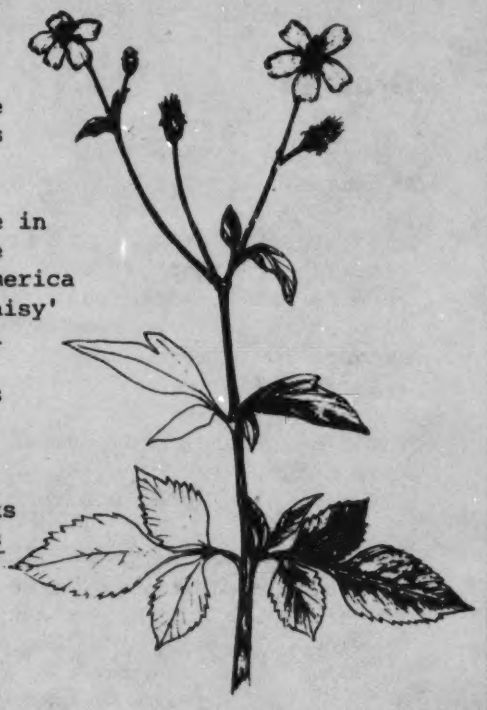
This is a common weedy species in Guam. In days before World War II, it was often used as a broom; and it dusted well, too. The local name suggests its resemblance to a cat's erect tail.

A striking feature of this plant is its spike with blue flowers, just a few at a time. It produces many side branches. The leaf is ovate and wedge-shaped with a toothed margin. The fruit is a drupe, enclosed by the calyx (all the sepals). The plant reproduces from seeds.

Some Chamorros say that this plant has medicinal properties. Roots are collected to use in cures of some illnesses.



The plant is easily grown as a house plant. The leaf is good to use for microscope study of plant cells and stomates (tiny breathing 'mouths' on leaves).



Spanish needle — Compositae
beggar's tick — Sunflowers
Bidens pilosa

Guam daisy was first collected here in the mid-'40's but probably was here long before then——from tropical America via the Pacific and Asia. Each 'daisy' is really a composite of many small flowers, both yellow and white. Lower leaves are simple, upper ones trifoliate, to 12 cm long, with serrate (toothed) margin.

The seed has hooks and easily sticks to animal fur and clothing. Bidens is widespread on the Island.

It can be used for pig feed.

Milkweed, cha'guan ababang, asunsion — Asclepiadaceae
Asclepias curassavica — Milkweeds

Cha'guan ababang, the Chamorro name, tells us that the plant is associated with a butterfly, the monarch. It uses the milkweed as a host for feeding and breeding.

This perennial herb grows to 1 m high in pastures and wastelands. The leaves are simple and opposite, with short petioles. The flower is an umbel on the main and side stalks. The bright orange and yellow florets come in whorls of 5. The dry fruit, 10 cm long, produces many seeds, each with a ring of silky hairs at the top. The fruit splits to release seeds. Some are spread by the wind.

The genus name for this plant is Asclepias, from the Greek god of healing, Asklepios. At one time the milky juice of milkweed was used for treating ringworm. It is also poisonous. Livestock avoid it. So should you.

32

Grasses

Family Gramineae
Grasses

Cotton grass, sour grass
Trichachne insularis

This grass is an upright perennial reaching a height of 1.5 m. It spreads out from the base, growing in bunches. The narrow, flat leaf extends 10 to 30 cm and is 2-12 mm wide.

The flowers are in a panicle with many dense, narrow, silky and silvery white spikelets that droop.

It grows in waste places like old fields. It reproduces by seed and runners. The hairy seed is spread by wind.

Cha'guan inifok
Chrysopogon aciculatus

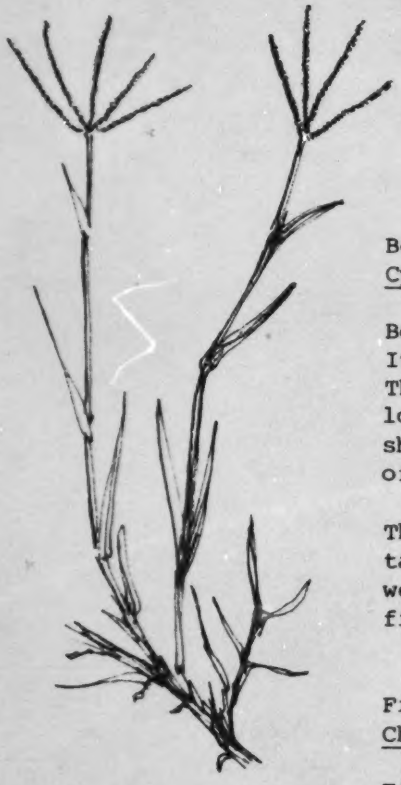
This creeping perennial produces brittle, thick basal leaves. The flat leaf is mostly 2 or 3 cm long, with some up to 15 cm, glossy green, and a little bit wavy.

The flower stem is erect and stiff, ending in a rigid, purplish, narrow flower spike. The sharp spikelet is effectively dispersed in animal fur, stockings, and trousers.

It's considered an annoying grass for lawns but has medicinal properties.

Foxtail, laso' katu
Setaria pallidefusca

Here's another laso' katu. The flower is a spike-like panicle. The stem of this grass grows 50 to 90 cm. The brownish-yellow mature flower is very hairy. It's common on roadsides of northern Guam.



Bermuda grass, cha'guan
Cynodon dactylon

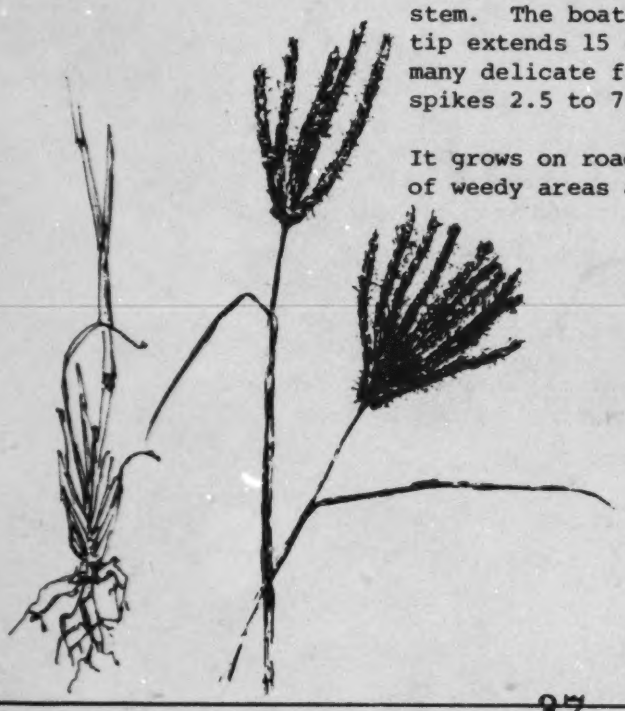
Bermuda grass is a creeping perennial. It roots at every node as it grows. The smooth stem bears leaves to 10 cm long. The flower head has 4 or 5 short finger-like spikes at the tip of the stem.

The plant is grown from seeds, vegetative cuttings or runners. It lives well in dry, sunny places in open fields and near beaches.

Finger grass, plush grass, cha'guan
Chloris radiata

Finger grass, an annual, grows about 60 cm high with a smooth, flattened stem. The boat-shaped leaf with rounded tip extends 15 cm. The flower head has many delicate finger-like purplish spikes 2.5 to 7.5 cm long.

It grows on roadsides and at the edge of weedy areas around schools.



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Wiregrass, cha'guan
Eleusine indica

This grass grows in clumps 30 to 60 cm high, with lots of branches at the base. The stem is flattened and pale green. The flower head with 2 to 6 flattened, finger-like spikes is 5 to 10 cm long.

The plant develops from seed and thrives in poor soil and areas exposed to trampling.

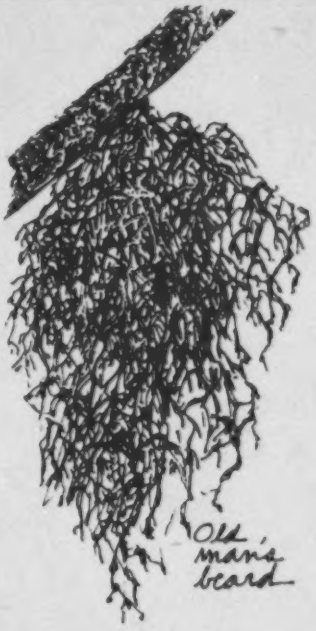
Crowfoot grass, cha'guan
Dactyloctenium aegyptium

This grass has flat leaf blades. The erect flower stem ends in 2 to 6 short, hairy, thick spikes. It grows mostly around buildings near gutters.

Sandbur, cha'guan laso' katu
Cenchrus echinatus

Older Chamorros identify this grass too as laso' katu, so that's at least 3 different plants with the same name. The spiny flower spike produces crowded, easily detached burs that stick to animals' fur and people's clothing. The burs contain sugar at maturity, so your boonie pet dog might like to munch them off your trousers.

Cenchrus thrives in light sandy soil, lawns and waste places.



Lichens

Somewhere around your schoolyard, you can come across them——on rocks or on trunks and branches of shrubs and trees. They may look like a kind of fungus, which partly they are. They're hairy, or circular and flattish, or circular and leafy. They're often different shades of gray-green-white.

If you look at one with a microscope, you can see many one-celled algae embedded in the flat part (thallus) or among the hairs (hyphae). So, you can correctly conclude that a lichen is part fungus and part alga.

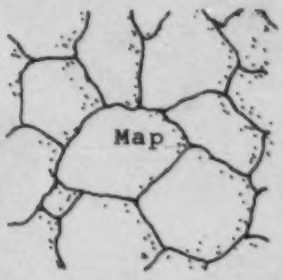
Because algae have chlorophyll, they can make food, using carbon dioxide, water, and energy from the Sun. Fungi, which have no chlorophyll, can't do this. You can see how handy it is for the fungi to accept algae as partners. The algae manufacture food and oxygen, part used for themselves, and part for the fungi. Chemical tests show that algae also produce vitamins. From the fungi, the algae get water, protection from injury and from blowing away. The living together of these 2 plants benefits both, so most likely this is mutualism, one kind of symbiosis. (See Freshwater, pp 23-27.)

There are 3 growth forms of lichen:

Crustose - like a very thin crust on rocks, shrubs and trees. They're tightly attached to the surface, and hard to scrape off. In the reproductive stage their fruiting bodies produce map-like or shorthand writing patterns. If the pattern is like shorthand it's a script lichen. If it's like a map, the species is a map lichen.

Foliose - The thallus of these lichens is like leathery leaves, and easy to take off the surface it grows on. It's usually grayish-green.

Fruticose - They're usually branched and drooping. The pale green old-man's-beard is one of these.



III - Animals

Older Chamorros grew up with the forest community and knew a lot about animals in Guam. They could identify them all. They knew the right weather conditions for hunting deer, pigs, birds and fruitbats. They knew how and where to catch them without modern weapons.

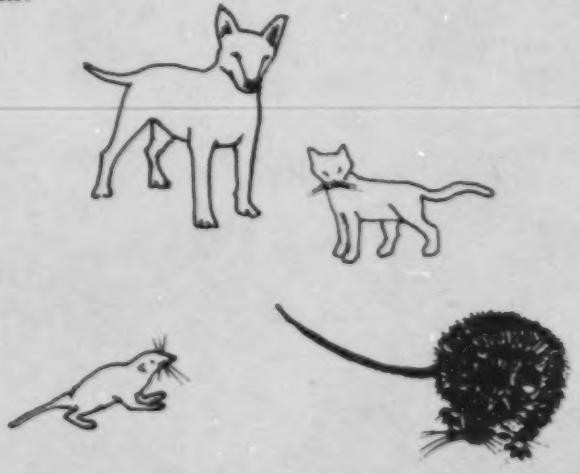
You probably won't see any game animals in the schoolyard but if you look around carefully you'll see birds, rats, toads and insects dining on grass seeds, leaves, and each other. Explore the field, open roadsides, courtyards, garbage stations, and underneath bushes. See how many of the animals in Schoolyard Surveys live in or visit your school community.

All animals are in the Kingdom Animalia. We're grouping them into 2 categories, vertebrates and invertebrates. Vertebrates have a backbone inside their body; invertebrates have none, though many have a skeleton on the outside. (Name some of both kinds of animal.)

Vertebrates

Mammals

Let's start with mammals you may see in the schoolyards: dogs, cats, mice, rats and shrews. Mammals are different from other animals in 3 ways: they have hair somewhere on their bodies, bear live young, and feed them with milk from mammary glands. The schoolyard mammals we've mentioned are in these 3 Orders: Carnivora, meat-eaters; Insectivora, insect-eaters; Rodentia, rodents, animals with gnawing front teeth.



Boonie dog, ga'lagu — Family Canidae - Dogs
Canis familiaris
(well-known dog)

During World War II many Chamorros had to go into hiding and abandon their pets——dogs, cats, carabao, horses, cows and birds. Domestic animals that go off into the boonies and live are feral, not the same thing as wild. (What do you think is the difference?)

The boonie dog population has multiplied greatly. Most of them stay in northern Guam. Sometimes you see them along the road or around homes or schoolyards searching for food. They knock down trash cans and are now considered pests.

On and in their bodies, boonie dogs support large populations of parasitic animals including ticks and worms.

Boonie cat, katu — Family Felidae - Cats
Felis domesticus
(domestic cat)

The feral cat also lives in the boonies. It prefers staying close to a chicken ranch where it preys on the baby chicks. It kills rats also, and probably Guam rail chicks (ko'ko').

House mouse — Family Muridae - Mice, rats
cha'kan Manila
Mus musculus
(mouse little-mouse)

The local name suggests that this mouse was introduced from the Philippines. In size and build it's like the white mouse sold in pet shops.

(Someone once thought that the lumps underneath skin looked like mice, and named them 'muscles'. See what your dictionary says.)

Cha'kan Manila likes to live in homes with wooden frames. It often hides behind or inside stored boxes. During Spring cleaning people often find mouse nests made of shredded paper. Four or 5 pinkish, hairless babies could have been reared in each nest.

The mouse lives in or around human homes, where it is a scavenger——it picks up bits of leftovers or improperly stored food.

Black rat, cha'ka — Family Muridae - Mice, rats
Rattus rattus
(rat-rat)

The black rat has adapted itself to life in the boonies close to ranches. Like the boonie cat, it preys on baby chicks. It also climbs coconut trees, cutting down the leaves and sucking juice from the cut stems. This isn't good for the tree! Rattus also digs into the ground for taro roots.

This cha'ka is native to Asia Minor. It is widespread in warm countries. It's quite large, and the boonie cat usually lets it alone. Many cha'ka live in the limestone forests of northern Guam.

Polynesian rat, cha'ka — Family Muridae - Mice, rats
Rattus exulans
(exiled rat)

The Polynesian rat also is black. It is active during the day——it's diurnal. It may run right across your path. It eats grain (= grass seeds), vegetables, fruits and leftover food. It also likes invertebrates——animals without backbones——like insects and worms. Another favorite food is fallen coconuts.

Norway rat, cha'ka — Family Muridae - Mice, rats
Rattus norvegicus

Norway rat is large and brown. It prefers living where there are lots of people. Like other rats, it has spread around the World as a result of shipping commerce. It started out in Japan and eastern Asia. (Why then is it called 'Norway rat'?)

Musk shrew, cha'ka — Family Soricidae - Shrews
Suncus murinus
(mouse-like shrew)

The first shrew recorded on Guam was collected at Apra Harbor in 1953. We think it came in accidentally from the Philippines.

The shrew has a long, pointed snout, large ears, small eyes, and poor eyesight. Its short, shiny hair is dark gray. It doesn't make a good pet. If you disturb one, it lets out a stink from its musk gland. Carnivores don't much prey on it.

The shrew eats insects——it's good to have around for insect control. We don't see many around any more——what's happened to Guam's shrews?

Birds

Guam has about 30 kinds of birds. Many of them are sea birds, shore birds, or forest dwellers, so it's not very easy to see them at schools. There the birds you could meet most often are the tree sparrow, dulili the golden plover, ko'ko' the rail, the chestnut mannikin, and the black drongo. Dulili and ko'ko' are the only local birds in our schoolyard group——the others are introduced. (Why are so few local birds among schoolyard visitors?)

By the way, dulili the plover is not just a local bird——it's a great traveler. It migrates to Guam during cold northern winters.

Tree sparrow — Family Fringillidae - Buntings, finches, sparrows
Passer montanus

In 1950, Guam noted its first Eurasian tree sparrow (from Europe and Asia). We assume it was set loose by its owner who lived near Piti. Four years later sparrows were seen at Asan, Piti, and Maina. By 1961 they were over all the Island. They were hit hard by Typhoons Karen and Pamela, but today (July 1977) they are reappearing.

The tree sparrow is small, with chocolate-colored feathers and black cheek spots. The bird eats grass seeds and often visits schoolgrounds for food thrown away. It also preys on insects. In turn, the ratsnake preys on it.

Chestnut mannikin — Family Fringillidae - Buntings, finches, sparrows
Lonchura ferrúginosa

Mannikin, sparrow, and ratsnake made their first recorded appearance here in 1950. The mannikin was first to reach a high population. It quickly spread around the Island and became a part of the swordgrass and weedy-shrub communities. The birds fed and flew together in small flocks, close to the ground. Drenched, lashed, and engulfed by Typhoons Karen and Pamela, their population plunged. Nowadays we see hardly any. (When did you last see one?)

The mature bird is chestnut brown with a black head and proportionately large whitish-blue finch-like bill. It can be captured and kept as a house pet——it came to Guam in a cage and then was set loose. The mannikin feeds mainly on grass seeds.

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Black drongo
Dicrurus macrocercus

Family Corvidae - Crows, jays

In 1935 the Japanese South Seas Development Company introduced the black drongo to Rota from Taiwan, for controlling insects. In 1950 the drongo flew from Rota to northern Guam. Even now it's more populous in the north than anywhere else on the Island.

The drongo perches and even nests on power lines. Sali, the Micronesian starling, our native blackbird, prefers to nest and sit in tall trees. The drongo is larger than sali and has a long forked tail. The drongo is all black. Sali's breast is mottled with pale yellow.

The drongo is a predator on sparrows, lizards, and insects. It often perches on cattle, feeding on ticks or on insects that the cow stirs up in the pasture. It also chases fruitbats.

Pacific golden plover
dulili
Pluvialis dominica
fulva

Family Charadriidae - Plovers, turnstones

This dulili flies great distances—— from Alaska to tropical Pacific islands like Hawaii and Guam, and back again, every year!

Unlike other dulilis, the golden plover doesn't feed on beaches. It prefers inland grassy places like school ballfields and large lawns.

Around September it comes to Guam wearing a dark eyestripe and light eyebrow, buffy-brown feathers, and light underparts.

By April it has changed colors and is ready to fly back to Alaska. Face markings have become black and white, and the breast is blackish. Shoulders, back and rump are mottled with black, gold, brown and white. Underparts are mixed with black. It's now ready for the short mating and nesting season in its northern home.

Guam rail, ko'ko'
Rallus owstoni

Family Rallidae - Rails, gallinules, coots

Guam is the only place in the World where this bird lives.

Once, ko'ko' could fly. Through many centuries, it lost this ability. There were no land animals to prey on it in Guam, and it didn't need to hurry up into the air. (What about now?)

Ko'ko' is a boonie bird but often comes out to feed and bathe along roadsides. Sometimes it sneaks into a backyard and dines with the chickens. It will eat almost anything——lizards, insects, coconuts, seeds, and table scraps.

Ko'ko' breeds the year round, laying eggs in the grass-built nest in thick grassy places. The chicks are black and downy. Mature ko'ko' is plain brown on its back and striped black and white below.

In the early 70's you'd see so many in one day you wouldn't even mention it. Nowadays you see so few that when you do see one you mention it! What's happened to them?

Marianas fruit dove
totot
Official Guam Bird
(so we include it here)
Ptilinopus rosei-
capillus

Family Columbidae - Pigeons, doves

I think the fruit dove is Guam's most beautiful bird. It's green above with a ruby red cap. Underneath it's mottled yellow, orange, purple, and yellowish-green. Legs and feet are greenish-yellow.

Totot lives in the undisturbed jungle. It can perch quietly on a tree branch for hours. But if you hear the soft cry, 'COO-c-c-c-c-coo, coo, coo', you know it's around. Look up——it might be just above you, even though the call seems to be coming from some distance away.

Totot feeds on fruits——wild papayas, ottot, lemon de China and inkberries.

Totot is a protected species——hunting it is illegal.

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Reptiles

Two kinds of reptile got to Guam early——the tiny blind snake, ulo' attilong, and some lizards. Guali'ek is the Chamorro name for small lizards like the house gecko, anole, skink, and the ranch gecko (achiak). Kolepbla the ratsnake is a very recent introduction. Hilitai is the monitor lizard.

Monitor lizard
hilitai
Varanus indicus
Native
Family Teiidae

Hilitai is frequently captured and brought to school for display. (We shouldn't call him an iguana. That's the name of a New World reptile that we've never had here.)

Hilitai isn't poisonous but it has sharp claws that can scratch deep, and a bite that can be painful.

If you go boonie-stomping in a ravine forest or limestone forest, don't be afraid if you hear a footstep in front of you. It's not a taotaomona, it's a monitor lizard trying to get away from you. Hilitai is hard to see because its greenish-black skin with yellow dots blends into the background.

The monitor lizard is a predator, taking shrews, birds, other lizards, snails, and even coconut crabs. To get eggs, it visits chicken ranches.

Hilitai can be a caged pet. Feed it raw ground beef and be sure to provide a large pan of water for it to bathe in. It has been seen visiting the rainwater drums at ranch houses.

Anole, 'chameleon'
guali'ek
Anolis carolinensis
Introduced
Iguanidae

This lizard can switch its color from green to brown and back again. For a long time people thought that it adopted the color of whatever it was sitting on. Now it's thought that changes in the lizard's body temperature make it change color. Test this out by bathing the animal in cold water and then in warm water, about 5 minutes each time. See what happens. Test the old theory, too.

The anole was first noticed on the Island in 1950, and it's thought that at least one pair got away from their owner.

This guali'ek likes living on trees and shrubs around houses. It is diurnal, feeding and mating in the daytime. The male shows off to the female by puffing up to expose its bright red throat. It also does this before a territorial fight. Like other lizards, the anole feeds on insects and spiders.

Skink
guali'ek halom tano'
Emoia caeruleocauda
Native
Scincidae

Guali'ek halom tano' is a boonie and forest lizard. It's very difficult to catch because it moves so fast. Anyway, after you catch it, then what?

This blue-tailed skink lays 2 eggs in cracks in coconut tree bark or in decaying logs. It's beneficial to people because of its appetite for insects.

Gecko, house lizard
guali'ek
Hemidactylus frenatus
Gekkonidae

A rapid tick-tick-ticking identifies this gecko. It is very welcome around homes, for it eats a lot of insects that are attracted to light. It lays its 2 eggs in cracks in the walls.

The house lizard is light tan. The animal can break off its tail if it's seized by an enemy. It can then regenerate (grow back) a new one, but once in a while the regeneration message gets mixed up and the gecko shows up with 2 tails.

The gecko has unique foot parts that let it walk on walls and smooth ceilings: for clinging it has tiny suction discs on its 5 flattened toes.

Ratsnake
kolepbla
Boiga irregularis
Introduced
Colubridae

In 1946 a stowaway, the ratsnake——from Malaya via the Philippines——was shipped to Guam in war cargo. People first saw it in the wild in Agat and Santa Rita grasslands. That was in 1950. Now it is widespread.

The adult snake grows to 2.5 meters. Its body is yellowish-brown. Poison fangs are at the back of the upper jaw. Small prey like anole are held in the jaws, poisoned, and swallowed. Larger animals are 'hugged to death' by constriction.

Constriction works like this: The snake coils itself around the prey. In normal breathing, animals inhale and exhale, increasing and decreasing the size of their lungs and chest. Every time the prey exhales and 'gets smaller', the snake takes up the slack; it coils tighter. Eventually the prey can't expand its chest and lungs anymore, so it suffocates.

The snake preys on wild birds, eggs, chickens, rats, shrews, and lizards. It's probably responsible for some of the decline in the population of ko'ko', Guam rail. There's no known predator here to keep the ratsnake population in check.

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Ranch lizard
achiak
Gehyra oceanica
Native
Gekkonidae

This dark brown gecko is half again as large as the house gecko. It prefers living in a ranch-type house and doesn't feed on insects that are attracted to light, taking others instead. Like the house gecko, it lays eggs in cracks of wooden walls and tree trunks.

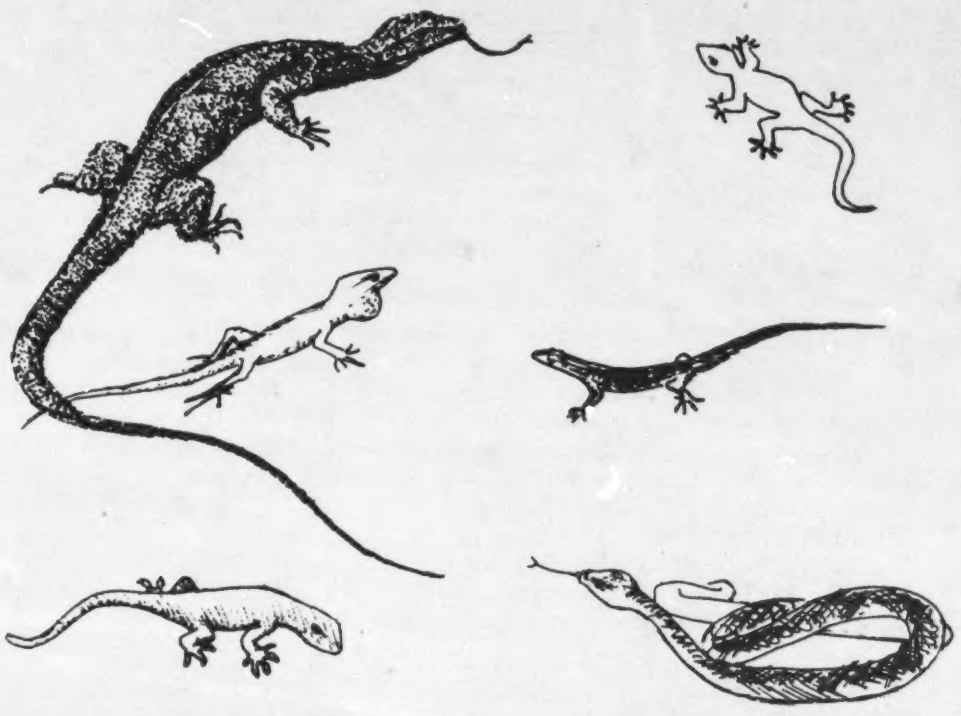
Achiak's cry is heard at dawn and at dusk. In legend, the lizard is saying its prayers. For this reason, older Chamorros hold achiak in great respect.

Blind snake
ulo' attilong
Typhlops braminus
Native
Typhlopidae

You might come across this tiny blind snake if you dig wild yams (gaddo') in the boonies. It lives in the soil underneath rotting logs or decaying gaddo'.

This shiny little animal is easy to mistake for an earthworm——but ulo' attilong is dry, has scales over all its body, a tongue (forked), and can move much faster than an earthworm. It weaves from side to side as it moves——an earthworm bunches up and then elongates in one direction.

It's a predator, eating termites, ants, worms and insect larvae.



Amphibians

Newts, salamanders, frogs and toads are amphibians (amphi = both, bios = life). Amphibians are born in water and grow up to live on land. The young have gills for breathing in water and a tail-fin for swimming. By the time they get to land, they've grown legs to get around with and lungs to breathe in air. On Guam we have plenty of toads and a few frogs, each represented by one species.

Amphibians have 3 life stages: egg, larva (tadpole), and adult. Eggs, with a protective layer of gelatin, are laid in water. After hatching, the young may eat the gelatin.

Toads and frogs look a lot alike, but there are differences. Toads have a dry, bumpy skin. They can live away from water, but return to it to breed. They lay eggs in strings. Frogs have a smooth, moist skin and stay close to water so they can easily keep wet. They lay eggs in clumps.

Guam's 2 amphibians, a toad and a tree frog, are introduced. (See Savanna, Old Fields, Roadsides, pp 48-51, 56.)

Toad
Bufo marinus
Family Bufonidae

The toad Bufo marinus was introduced from Hawaii in 1937 to control the land slug Veronicella leydigi. This was a project of the late Chamorro naturalist Antonio R. Cruz. He brought some specimens home to show his family before releasing them. His sister, now 70 (1977), remembers the occasion well and says that toads (not frogs) were established on Guam at that time.

Bufo's most striking features are its rough skin and circular parotoid glands behind the head. Toads can be gently handled with no problems. If one is 'annoyed', however, it can secrete a whitish milky poison from these glands. Don't you or your dog get any of it on cuts or in the mouth.

The toad is basically brown. Some are also greenish, reddish, or yellowish.

On a hot day Bufo hides under rocks, logs, or tree roots, and sometimes inside plant pots. At night and on rainy days it comes out to feed and mate. It eats grass, slugs, caterpillars and adult insects, and also young toads.

Toads now live everywhere here——in roadsides, backyards, forests, puddles, rivers——even in estuaries where freshwater mixes with seawater. It may seem strange to see a toad swimming near the beach, but someone else noticed this a long time ago and gave the toad its name (Bufo) marinus. Check it out——one good place is Fonte River estuary near Adelup Beach.

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Invertebrates

Insects

Insects are invertebrates with 6 legs. Usually the body is in 3 sections——head, thorax, and abdomen. Legs and any wings attach to the thorax. Most insect orders are grouped according to wing type or number:

Order		Kind of Insect
Orthoptera	(straight-wing)	cockroaches, mantises, grasshoppers
Isoptera	(equal-wing)	termites
Coleoptera	(sheath-wing)	beetles (about 1/3 of all insect species)
Lepidoptera	(scaly-wing)	moths, butterflies
Diptera	(two-wing)	flies, mosquitoes
Hymenoptera	(membrane-wing)	wasps, ants, bees

As they mature, insects go through different kinds of metamorphosis (meta = after, morph = shape, osis = condition). Incomplete metamorphosis involves 3 stages:

egg - nymph - adult (as in grasshoppers, mantises, cockroaches)

Complete metamorphosis includes 4 stages:

egg - larva - pupa - adult (as in butterflies, houseflies, mosquitoes)

Many insects are beautiful.

Some help people. Bees pollinate flowers and provide food. Silkworms make thread. Mantises eat harmful (and helpful) insects.

Other ones, including some beauties, are harmful. Most moths and butterflies eat plants. Grasshoppers destroy crops, roaches contaminate food, flies and mosquitoes carry disease.

Some, including beneficial ones, give painful stings.

There are about as many kinds of insects in the World as all other species of animals and plants combined. That's one reason you'll find lots of insects at school.

47

Praying mantis
apacha', apahigai
Hierodula petellifera
Order Orthoptera
Family Mantidae

Praying mantis, a predator, is one of the most beneficial insects, eating all kinds of other insects. Mantises can either be green or brown, blending in well with the environment.

They wait on leaves or branches, using the 2 rear pairs of legs for support and holding up the front pair as if praying. In this position the front pair are ready to grab any passing prey.

The female lays hundreds of eggs in a straw-colored egg case attached to the bark of trees or a shrub branch.

Grasshopper, apacha'
Order Orthoptera
Family Acrididae

Our grasshoppers come in green or brown. The green one is apacha' na'suette (for good luck); the brown one is apacha' na'dimalas (for bad luck). In the old days a green grasshopper was thought to bring good luck if it entered a house. A brown one meant bad luck and was immediately killed if anyone saw it in a room.

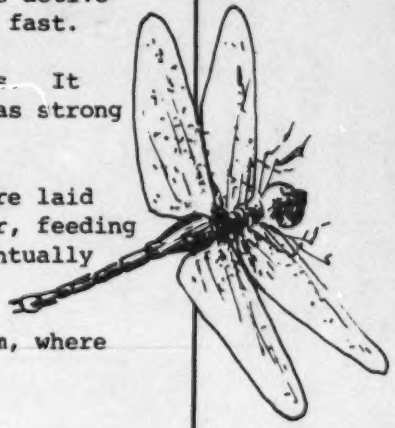
Apacha' lives in grassy unmowed areas where it feeds on the grass——it's a herbivore.

Grasshoppers have a pair of large, strong hind legs for jumping.

To lay her eggs, the female digs the ground with her ovipositor (egg-placer) at the end of her abdomen. Eggs hatch into wingless nymphs that eventually grow wings. Tree sparrows, plovers, and praying mantises prey on apacha'.

Dragonfly, dulalas
Libellula sp.
Order Odonata
Family Libellulidae

Dulalas the dragonfly is a strong flier. We often see it a long way away from its natural habitat, water. It's active during the day, and can fly very fast.



Dulalas has a long, slender body and 4 transparent wings. It holds them out when resting. The large rotating head has strong chewing mouth parts.

The dragonfly has incomplete metamorphosis. The eggs are laid in water, maybe on aquatic plants. Nymphs live in water, feeding on mosquito and other larvae, and even small fish. Eventually they develop into the carnivorous adult dragonflies.

Most of our dragonflies are in southern and central Guam, where most of the freshwater environments are.

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Termite
Reticulotermes formosanus
Order Isoptera
Family Termitidae

Termites are colonial and organized in 3 castes: reproductive, worker, and soldier.

Our ground-nesting termite comes out in the early rainy season——the winged reproductive caste emerges from its colony to establish a new one. They are strongly attracted to light.

Termites eat anything with wood or cellulose in it. They may eat out the inside of wooden tables, building foundations, or walls, leaving a thin shell that could collapse unexpectedly.

Poinciana looper
ulo' babali
Pericyma cruegeri
Order Lepidoptera
Family Noctuidae

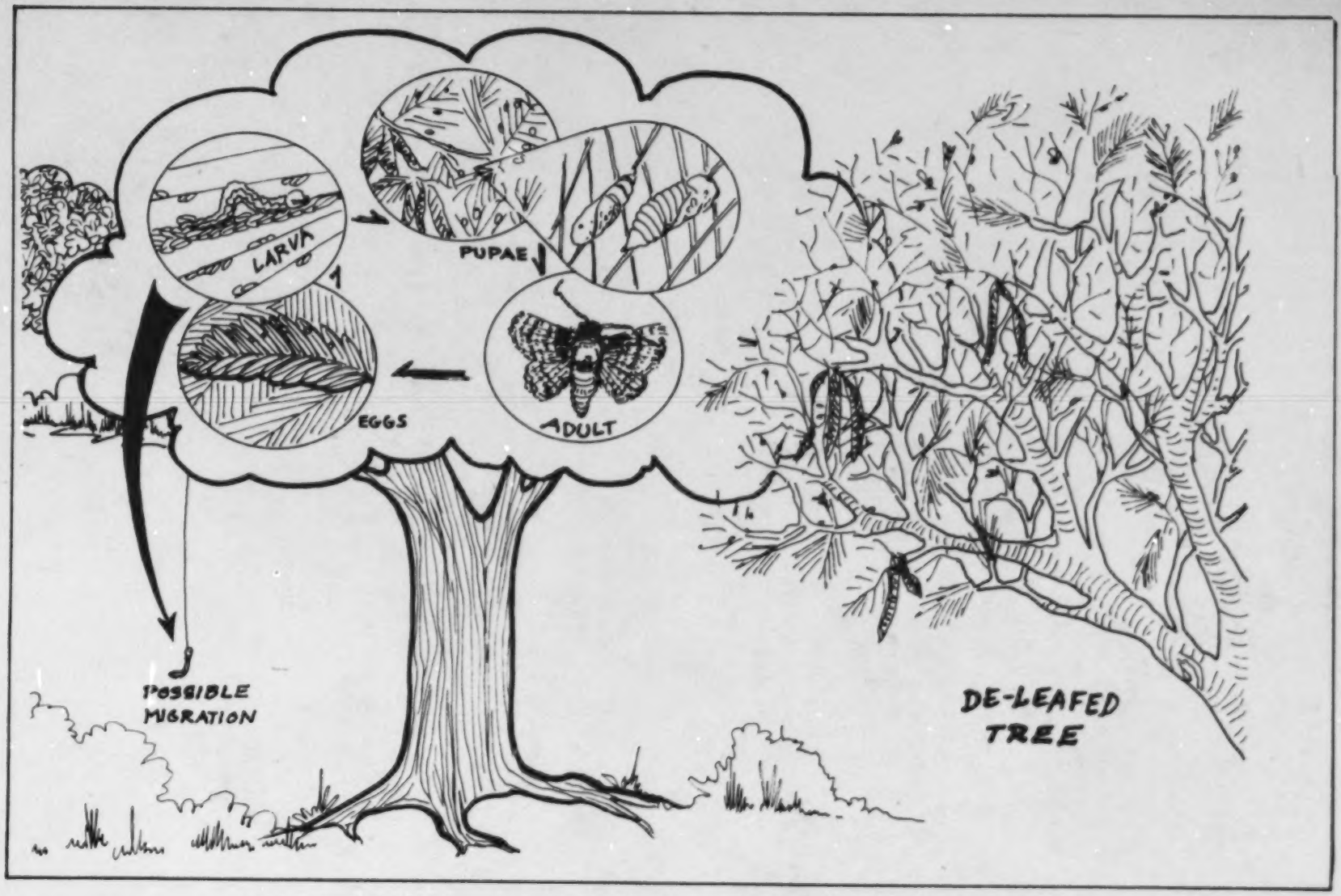
Poinciana looper is the larval stage of a noctuid moth. The looper eats the leaves of flame trees and yellow poinciana. It appears at different times of year. Be on the lookout for it.

It's a small, thin, hairless, red, white, black and green inchworm. When the mature larvae pupate they cover themselves with a grayish-white web and leaflets of the host tree. If the immature larvae eat up all the leaves on one tree, they crawl down or drop off it and crawl to another tree to pupate. Praying mantises eat loopers.

On Guam the pest was first noted in July 1971 at Ipan and Inarajan. Now it's widespread here. Adult noctuid moths are small and brownish-gray. They come out at night and are seldom noticed. (Noctuidae = night-timers.)

Citrus swallowtail butterfly
ababang attilong
Papilio polyxenes
Order Lepidoptera
Family Papilionidae

Our citrus swallowtail lays eggs on the undersurface of lemon tree leaves. The larvae are first black with white patches, and later green caterpillars ringed with black and yellow spots. They eat the tender lemon leaves, but can be controlled by hand-picking. When the caterpillar gets big and fat, it changes to a pupa, a bright green chrysalis that hangs by its narrow tail against the stem. After some days the chrysalis breaks down to reveal a beautiful black butterfly with a row of white spots on its swallowtail wings.



LIFE CYCLE OF THE POINCIANA LOOPER

50

Housefly, lalo'
Musca domestica
Order Diptera
Family Muscidae

The housefly is a health threat to people and other animals. It carries and spreads diseases it picks up from what it walks on and eats. It feeds on and breeds in feces, dead animals and decaying fruits. Among the diseases it can spread are typhoid fever and dysentery. Cleanliness is the best way to control this insect. Keep food covered as much as possible. Make sure garbage cans are tightly covered.

The housefly's large compound eyes help it see in many directions to escape an oncoming enemy or flyswatter.

On a likely food source, the female lays batches of many eggs. Eggs hatch into maggots——tiny white conical larvae, pointed at the head. After 4 to 5 days of feeding the maggots pupate. The entire life cycle takes only 2 weeks.

Ant, otdot
Order Hymenoptera
Family Formicidae

Guam has several species of ants. Some live in decaying logs, some make anthills in the soil, and some go after our food at home. Ants have distinct, clearly-divided body segments.

Ant colonies are well organized. Queens mate with males and lay eggs. After mating, the wings drop off. Workers do the work of the hive and explore for food. They usually leave a body scent on the return trail so other ants can follow it to the food source. That's the reason ants walk single file.

Some ants are predators; some are herbivores (plant-eaters); others are scavengers. Otdot attilong is a scavenger; it eats what it finds lying around, including leftovers.

Honeybee, obea
Apis mellifica
Order Hymenoptera
Family Apidae

Bees help pollinate flowers and trees. Honeybees are colonial and have female workers and queens, and male drones. Workers make up most of the colony. The one you see flying from flower to flower, collecting pollen and nectar, is the worker. It has bristles and a yellow-and-black-striped abdomen. It likes Bidens (Guam daisy, beggar's tick) and other showy flowers.

Nectar is converted into honey in the bee's stomach. Pollen is put in the leg pockets and brought back to the hive to feed the young.

We have 3 common wasps, the mud-dauber, yellowjacket, and small brown wasp.

Mud-dauber wasp
gonggong
Order Hymenoptera
Family Vespidae (large mud-daubers)
Family Eumenidae (small mud-daubers)

Mud-daubers mind their own business unless you annoy them. They are interesting to watch as they build nests. The large mud-dauber may build a small colony of individual chambers.

Before completing each one, she finds and paralyzes some caterpillars, one at a time, and brings them to the 'apartment'. She neatly folds them onto the chamber floor, lays an egg on the ceiling, and seals up the opening. The egg hatches, the wasp larva falls right onto its ready-made meals.

Wasps are excellent controllers of other insects.

A 3-cm long large mud-dauber checks the first unit in her new apartment complex.

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Yellowjacket
sasatan amariyu
Polistes macaensis
Order Hymenoptera
Family Vespidae

Do both male and female wasps sting? Is the ovipositor (egg-laying tube) modified into a stinging organ or vice versa? Does the male have an ovispositor?

Sasatan amariyu builds a roughly rounded nest on shrub or tree branches. Once, during the dry season, males and a few females leave their nest and migrate to wood-frame houses. We don't know for sure why they do this, perhaps for mating purposes. Can you form another theory? While at these temporary stations (human homes), sasata is not mean. It doesn't sting.

Children used to enjoy having these 'tame' yellowjackets in and around their homes.

Brown wasp
sasatan dikike'
Icaria marginata
Order Hymenoptera
Family Vespidae

This is the stinger. The nest is attached to shrubbery. In each nest may be 4 or 5 adults. The sting can cause a severe reaction, requiring antihistamine treatments. The Chamorros treat the stung area by applying urine. In the worst cases they apply a vinegar compress. These 2 methods seem to weaken the poison.

Spiders

Guam has several species of spiders. They're often called insects, maybe because of their size and jointed legs. They're not insects. They're arachnids, with 2 main body parts, and 4 pairs of legs.

The head-thorax is one part; the other is the abdomen. Spiders have poison glands and piercing jaws. Very, very few species, and none on Guam, are dangerous to people.

Female spiders have silk glands at the end of the abdomen. The glands produce fibers for building webs, wrapping prey, and making egg cases. The webs are used as shelter and to catch prey.

Spiders eat mostly insects——flies, mosquitoes and grasshoppers. They inject liquid enzyme into the prey's body. This digests internal parts, which are then sucked up. The hard outer parts are discarded.

Guam spiders are locally grouped as payu'ak——those that don't build webs——and sanye'ye'——the ones that build webs. We'll give you general descriptions of both.

Payu'ak, Lycosa sp.
Lycosidae

Payu'ak is the largest Island spider. It looks like the wolf spider of the Mainland. Its hairy body is large and gray. It likes living in ranch-type dwellings, especially those roofed with coconut fronds. During the day it hides under the fronds, beneath stones, and behind wooden walls. It has good eyesight and comes out at night to hunt for food like insects.

The female carries the eggs in a silky case attached to the lower surface of her abdomen.

Sanye'ye'
house spider
Theridion sp.
Theridiidae

The house spider builds cobwebs. These trap dust and mosquitoes and other small insects in the house. This sanye'ye's body is less than 1 cm long, with hair-like jointed legs. The female lays 10 to 25 eggs. They hatch in a week.

Sanye'ye'
garden spider
Argiope sp.
Argiopidae

Stomping through weeds and shrubs, you can come across large and beautiful webs. These are the homes, feeding grounds and breeding places for some of man's best friends. These spiders trap and kill insects that would otherwise eat garden plants. Study the species of insects trapped by spiders. Find out how each one gets eaten. This is also a good setup for studying populations.

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Gastropods

African snail
akaleha'
Achatina fulica
Family Achatinidae

Akaleha' eats crops and garden plants and is a real pest on Guam. It crawls over dog and chicken manure, presumably eating. Make what you can of that, ecologically. Its original home is in East Africa and it is not a pest there.

It's had help spreading to other tropical lands where it has no natural enemies to control it. Guam's first record of giant African snail was made in 1945 by Joaquin Guerrero. He found the large snail in his village of Santa Rita.

African snails go into 'summer sleep' during the dry season. They mate during the rainy season. One snail can lay up to 150 small yellowish eggs at a time. They're laid in soil litter, dead leaves and other plant and animal material. Each snail has male and female reproductive organs. Snails pair up and swap sperms with each other. This fertilizes their eggs. The cross-breeding gives the offspring good chances of surviving.

The Department of Agriculture has brought in 3 species of carnivorous snails to control akaleha'. One kind has been effective, but not the other two. Find out which.

Humans in many parts of the World eat African snail. Some people consider it a delicacy. After being cleaned, akaleha' can be cooked in several ways, for instance baked with butter and in chop suey. (For one complete recipe, see Savanna, Old Fields, Roadsides, p 60.)

The clean empty shells can be painted for ornaments.

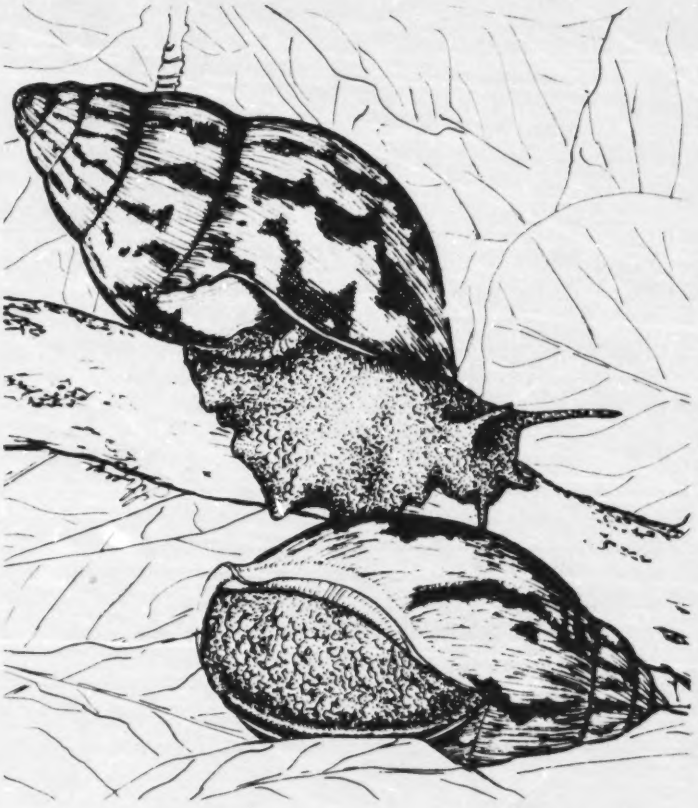
Black slug, tagulan tano'
Veronicella leydigi
Limacidae

Tagulan tano' is the black land snail without a shell. The adult can be 7.5 cm long. It has 2 pairs of antennae. Eyes are at the tips of the larger pair.

Tagula secretes a glossy whitish slime which lubricates its path and protects it from injury on any sharp surface. It is active at night and eats garden plants. This makes it a pest. In the daytime it hides under trash, a leaf, rock, or coconut husk.

An individual slug is both male and female and mates with other slugs. It lays many eggs in the soil. The eggs hatch into tiny slugs all crowded together in a soil depresssion.

The slug's natural enemy is Bufo the toad.



Epilog

We are all naturalists, especially when we're young. We find small things in our surroundings very attractive. Delicate colors and perfect shapes of plants and animals catch our interest. For hours we watch and wonder what they are, how they got here, and where they are going. I hope that the limited information in this book will help answer some of your questions. No doubt you'll find animals and plants around your school not detailed here. For additional help, check the reference list (p 60) and other books in the Life On Guam series.

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Where are the Trees, Shrubs, and Ornamental Herbs?

(x marks the school)

(as of August 1977)

TREES		AJH Agat Jr. High	AJJH Agueda Jr. High	BJH Johnston Jr. High	DJH Barrigada Jr. High	IJH Dededo Jr. High	SSJH Inarajan Jr. High	JFK Simon Sanchez Senior High	GW J. F. Kennedy Senior High	George Washington Senior High
African tulip	page 5		x					x	x	
Australian pine	6	x		x	x	x		x	x	
Flame tree	6	x	x	x	x			x	x	
Golden shower	7				x	x		x		
Ibba' (gooseberry)	15	x	x		x				x	
Ifil	17						x			
Indian almond (talisai)	7								x	
Kamachili	14				x	x		x		
Mango	16	x				x		x		
Monkeypod	8		x		x			x	x	
Narra	5							x		
Norfolk pine	9	x	x			x		x	x	
Orchid tree	9	x					x	x		
Palms: Chinese fan	12							x	x	
Coconut	11	x	x	x	x	x	x	x	x	
Pugua China	12	x			x	x		x		
Royal	12							x	x	
Palu Maria	10	x			x	x	x	x	x	
Pink tecoma	10	x		x	x	x	x	x	x	
Plumeria	13	x	x	x	x			x	x	
Rubber tree	13		x	x			x		x	
Sea grape	16							x		
Umbrella tree	13						x		x	
SHRUBS										
Allamanda	18							x		
Beefsteak plant	18		x		x				x	
Bougainvillea	19				x					
Crape Myrtle	20							x		
Croton	19	x	x	x	x		x	x	x	
Federiku palm	20								x	
Hibiscus	21	x	x	x	x			x	x	
Ixora	21	x							x	
Jatropha	22				x	x	x		x	
Oleander	22				x			x		
Panax	23	x	x					x		
Poinsettia	23							x		
Tangantangan	24	x	x	x	x		x	x	x	
ORNAMENTAL HERBS										
Banana	26	x	x			x		x		
Elephant ear	25							x	x	
Spider lily	26							x		
Ti plant	25		x				x	x	x	

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